

VPDES PERMIT FACT SHEET

This document gives the pertinent information concerning the **reissuance** of the VPDES permit listed below. This permit is being processed as a **minor municipal** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

The discharge results from the operation of a **0.0048 MGD sand filter system** serving a nursing home. Proposed 0.0066 MGD and 0.025 MGD facilities will be integrated fixed film activated sludge (IFAS) systems. This permit action consists revising the *E. coli*, dissolved oxygen, total suspended solids, BOD₅ and ammonia limits; adding temperature monitoring; and revising special conditions. (SIC Code: 4952)

1. **Facility Name and Address:**
Woodhaven Nursing Home STP
PO Box 168
Montvale, VA 24122
Location: 13055 West Lynchburg-Salem Turnpike
2. **Permit No:** VA0074870 Existing Permit Expiration Date: April 15, 2013
3. **Owner and Facility Contact:**
Mr. David F. Graves, Owner-Administrator, (540) 947-2207 woodhaven1993@gmail.com
4. **Application Complete Date:** January 22, 2013
Permit Drafted By: Becky L. France, Water Permit Writer
Date: January 23, 2013, Revised 2/5/2013
DEQ Regional Office: Blue Ridge Regional Office
Reviewed By: Kevin A. Harlow, Water Permit Writer
Reviewer's Signature: *Kevin A. Harlow* Date: 2/6/13
Public Comment Period Dates: From: 2/28/13 To: 3/29/13
5. **Receiving Stream Classification:**
Receiving Stream: Goose Creek, South Fork, UT (River Mile: 0.82)
Watershed: VAW-L20R (Upper Goose Creek Watershed)
River Basin: Roanoke River
River Subbasin: Roanoke River
Section: 5a
Class: III
Special Standards: PWS
7-Day, 10-Year Low Flow: 0.27 MGD 7-Day, 10-Year High Flow: 0.33 MGD
1-Day, 10-Year Low Flow: 0.27 MGD 1-Day, 10-Year High Flow: 0.32 MGD
30-Day, 5-Year Low Flow: 0.30 MGD Harmonic Mean Flow: 0.37 MGD
Tidal: No 303(d) Listed: No*

(*The receiving stream is in the Staunton River Watershed TMDL for bacteria and the Lower Roanoke River Watershed TMDL for PCBs. A bacteria wasteload allocation TMDL is assigned to this discharge. Attachment A contains a copy of the flow frequency determination memorandum.)

6. **Operator License Requirements:** None (0.0048 MGD facility)
III (0.0066 MGD facility and 0.025 MGD facility)
7. **Reliability Class:** III (0.0048 MGD facility)
II (0.0066 MGD facility and 0.025 MGD facility)
8. **Permit Characterization:**
☒ Private ☐ Interim Limits in Other Document
☐ Federal ☐ Possible Interstate Effect
☐ State
☐ POTW
☒ PVOTW
9. **Wastewater Treatment System:** A description of the wastewater treatment system is provided below. See **Attachment B** for the wastewater treatment schematics and **Attachment C** for a copy of the site inspection report. Treatment units associated with the discharge are listed in the table below.

Table I
DISCHARGE DESCRIPTION

Outfall Number	Discharge Source	Treatment (Unit by Unit)	Flow (Design)
001	Woodhaven Nursing Home STP	Proposed Treatment System Solids retention tank Equalization tank Grinder pumps (2) Pre-classifying filter Oxygenation tank Heater Bioreactor (IFAS) Settling basin Process storage tank Ozone Generator Disk filter Ultrafilter UV light Activated alumina filter UV light Dechlorination	0.0066 and 0.025 MGD

Outfall Number	Discharge Source	Treatment (Unit by Unit)	Flow (Design)
001	Woodhaven Nursing Home STP	Existing Sand Filter System Septic Tanks (2) Dosing Tank Sand filters (3) Chlorine disinfection Chlorine contact tank Dechlorination	0.0048 MGD

Woodhaven Nursing Home operates an intermittent sand filter system with a design capacity of 0.0048 MGD. The wastewater flows into two septic tanks in series and then a dosing tank. Wastewater is distributed to one of three sand filters. Each sand filter has a metal splash plate on the distribution arm that is periodically moved to different locations within the sand filter. The sand is 30 feet deep with underdrains consisting of drain tile piping. The effluent flow is measured by a flow meter. The discharge from the sand filter is chlorinated and dechlorinated prior to discharge to an unnamed tributary to the South Fork of Goose Creek. The permittee has proposed an integrated fixed film activated sludge (IFAS) reactor system for the 0.0066 MGD and 0.025 MGD design facilities. See **Attachment B** for a summary of the proposed treatment system.

10. **Sewage Sludge Use or Disposal:** A VPDES Sewage Sludge Permit Application Form was submitted for this facility to address disposal of sewage sludge from the wastewater treatment facility. Primary sludge from the solids retention tanks is periodically transported to the Western Virginia Water Authority Water Pollution Control Plant.
11. **Discharge Location Description:** A USGS topographic map which indicates the discharge location, any significant dischargers, any water intakes, and other items of interest is included in **Attachment D**. The latitude and longitude of the discharge is N 37°23'52.00", E 79°45'07.99".

Name of Topo: Villamont Number: 109A

12. **Material Storage:** Calcium hypochlorite and sodium sulfite tablets are stored outside in watertight containers.
13. **Ambient Water Quality Information:** Memoranda or other information which helped to develop permit conditions (special water quality studies, STORET data, and any other biological and/or chemical data, etc.) are listed below.

DEQ conducted several flow measurements just upstream of the outfall at Woodhaven Nursing Home STP. The measurements and the same day daily mean values from a continuous record gauge upstream of the discharge point on Tinker Creek near Daleville, Virginia were plotted on a logarithmic graph and the associated flow frequencies above the discharge point were determined from the graph.

Woodhaven Nursing Home withdraws spring water for the nursing home. The withdrawal occurs about 300 feet upstream from the discharge. It was assumed that the site specific stream measurements were made downstream of the withdrawal, so adjustments in the calculated regression equation outfall values are not needed. **Attachment A** contains a copy of the flow frequency determination memorandum.

Data for STORET Station 4AGSF002.16 were collected upstream of the outfall on the South Fork of Goose Creek at the State Road 607 bridge in the Montvale area. The 90th percentile temperature and pH and average hardness used in the wasteload allocation spreadsheets were determined from these STORET station data.

Woodhaven Nursing Home STP discharges into the Upper Goose Creek Watershed (VAW-L20R) as described in the 2010 Impaired Waters Summary (**Attachment E**). The area downstream of this discharge beginning at the confluence with the main stem of Goose Creek has been designated as fully supporting for the aquatic life and swimming uses. Goose Creek ultimately enters the Roanoke River, which has a VDH health advisory from eating fish containing PCBs. Therefore, Goose Creek is included in the TMDL Impairment for PCBs. The discharge is also located within the boundaries of the Roanoke River Bacteria TMDL.

The Goose Creek impairment (L20R-04-01-BAC) begins at the confluence of North and South Forks of Goose Creek and extends downstream to the mouth of Bore Auger Creek. The impairment use is recreation. The *Bacteria TMDLs for the Cub Creek, Turnip Creek, Buffalo Creek, Buffalo (UT) Creek, and Staunton River Watersheds, Virginia* contains an *E. coli* wasteload allocation for this facility. The wasteload allocation matches the existing load (8.36E+09 cfu/yr) identified in the TMDL document. The TMDL was published on April 2006, approved by EPA on June 22, 2006, and approved by the SWCB on June 27, 2007. However, the allocations and existing load were based on a 4,800 gpd design flow. The facility is permitted for two tiers of expansions to 6,600 gpd and 25,000 gpd. Allocations will be revised to include the proposed design capacities of 6,600 gpd and 25,000 gpd and published in the next TMDL modification. The TMDL wasteload allocation is based upon the bacteria water quality criteria in 9 VAC 25-260-170. An *E. coli* limit ensures compliance with this wasteload allocation. **Attachment E** contains the 2010 Impaired Waters Fact Sheet and selected pages from the TMDL document.

This segment of the Roanoke River is listed on the 303(d) list for PCB contamination from fish tissue and sediment. For this segment, the fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Control, PCB fish consumption advisory. This impaired section of the Roanoke (Staunton) River is included in the Roanoke River PCB TMDL report which was approved by the EPA on April 9, 2010 and by the State Water Control Board on December 9, 2010. The report study area includes 96 miles of the lower Roanoke (Staunton) River Watershed from Leesville Dam downstream to its confluence with the Dan River. This report lists Woodhaven Nursing Home STP as a point source discharge, but a wasteload allocation has not been assigned to this facility. Since this facility receives wastewater from a nursing home and has no industrial or commercial connections, no potential PCB sources have been identified. So, PCB monitoring has not been included in the permit.

14. **Antidegradation Review and Comments:** Tier 1 _____ Tier 2 X Tier 3 _____

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. Woodhaven Nursing Home STP discharges into an unnamed tributary to the South Fork of Goose Creek which is listed as a public water supply in the segment where the discharge is located. The unnamed tributary in this segment (VAW-L20R) is not listed on Part I of the 303(d) list for exceedance of water quality criteria. There are no data that indicate that the water quality exceed water quality criteria. Therefore, this segment is classified as a Tier 2 water, and no significant degradation of existing quality is allowed.

For purposes of aquatic life protection in Tier 2 waters, "significant degradation" means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, "significant degradation" means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated. The antidegradation baselines for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where:

"WQS" = Numeric criterion listed in 9 VAC 25-260-00 et seq. for the parameter analyzed

"Existing quality" = Concentration of the parameter being analyzed in the receiving stream

When applied, these "antidegradation baselines" become the new water quality criteria in Tier 2 waters, and effluent limits must be written to maintain the antidegradation baselines for all pollutants. Antidegradation wasteload allocations calculated in the previous permit reissuance for the different facility design capacities have been revised with updated 90th percentile effluent temperature and pH data. For the 0.0066 MGD and 0.025 MGD facilities, the DO and BOD₅ limits, where applicable, prevent a significant lowering of DO more than 0.20 mg/L from the existing level (90 percent DO saturation value).

The existing background concentrations were considered to be zero for all pollutants except for ammonia. Currently, the facility does not have an ammonia limit. Twelve effluent data points

for total kjeldahl nitrogen were collected from 1996 to 1997. These data were used to estimate the existing ammonia concentration in the receiving stream by assuming that ammonia is equal to total kjeldahl nitrogen (TKN) minus 3 mg/L refractory nitrogen. Instream concentrations during 1Q10 and 7Q10 flows were calculated for each of the estimated ammonia concentrations. Using the estimated instream ammonia data and the STATS program, the expected values of ammonia in the receiving stream were calculated at 1Q10 and 7Q10 flows. The expected values were used as the existing background concentration for ammonia in the antidegradation baseline calculations. These calculations have been included in **Attachment G**.

The current 0.0048 MGD facility began discharging in 1960. This discharge began prior to the antidegradation policy requirements set forth in the Clean Water Act on November 28, 1975. Existing grandfathered facilities that propose an expansion or an increase in the discharge of pollutants are subject to antidegradation requirements for the expanded facilities. This facility's discharge is existing, so the antidegradation baselines do not apply to the 0.0048 MGD facility. Permit limits for the current facility are written to meet the water quality standards.

The permit limits for the existing and proposed facilities are in compliance with antidegradation requirements set forth in 9 VAC 25-260-30. The antidegradation review was conducted as described in Guidance Memo 00-2011.

15. **Site Inspection:** Date: 7/18/12 Performed by: Becky L. France
Attachment C contains a copy of the site inspection memorandum. The last technical and laboratory compliance inspection was conducted by Gerald A. Duff on July 18, 2012.
16. **Effluent Screening and Limitation Development:** DEQ Guidance Memo 00-2011 was used in developing all water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq.). Refer to **Attachment G** for effluent data and **Attachment H** for the wasteload allocation spreadsheets and effluent limit calculations. See **Tables II-1** through **II-3** on pages 19-21 for a summary of limits and monitoring requirements and **Table III** on pages 22-23 for changes made to the effluent limitations and monitoring requirements.

A. **Mixing Zone**

The MIXER program was run to determine the percentage of the receiving stream flow that could be used in the antidegradation wasteload allocation calculations. The program output indicated that 100 percent of the 7Q10 and 1Q10 may be used for calculating acute and chronic antidegradation wasteload allocations (AWLAs) for the 0.0048 MGD, 0.0066 MGD, and 0.025 MGD facilities. Copies of the printouts from the MIXER run are enclosed in **Attachment H**.

B. **Effluent Limitations for Conventional Pollutants**

Flow – The permitted design flow of 0.0048 MGD for this facility is taken from the previous permit and the application for the reissuance. Design flows of 0.0066 MGD and

0.025 MGD represent future upgrades. In accordance with the VPDES Permit Manual, flow is to be estimated and reported daily.

pH – Between June 2008 and November 2012, there were no exceedances of the pH limits. The pH limits of 6.0 S.U. minimum and 9.0 S.U. maximum have been continued from the previous permit. These limits are based upon the water quality criteria in 9 VAC 25-260-50 for Class III receiving waters and are in accordance with federal technology-based guidelines, 40 CFR Part 133, for secondary treatment. Grab samples shall continue to be collected once per day.

Total Suspended Solids (TSS) – Between June 2008 and November 2012, there were no exceedances of the total suspended solids limits. The TSS limits are technology-based requirements for municipal dischargers with secondary treatment required in accordance with 40 CFR Part 133. These concentration limits for the 0.0048 MGD facility of 30 mg/L monthly average and 45 mg/L weekly average shall continue from the previous permit. The loading limits for the 0.0048 MGD facility were previously given as one significant figure. In accordance with current Agency guidance, the 0.0048 MGD loading limits have been revised as 540 g/d monthly average and 870 mg/L weekly average to reflect two significant figures.

The loading limits are less stringent than the limits in the previous permit. In accordance with 9 VAC 25-31-220L.2(2), Section 402(3) of the Clean Water Act, and 40 CFR Section 122.62, backsliding on these technology based loading limits to correct a technical error is allowed. The same concentration limits for the 0.0066 MGD, and 0.025 MGD facilities shall be continued from the previous permit. The 0.0066 MGD facility loading limits have been revised to reflect two significant figures. In accordance with current Agency guidance, the 0.0066 MGD loading limits have been revised as 750 g/d monthly average and 1100 g/d weekly average. Backsliding on limits for the proposed 0.0066 MGD facility is allowed because the limits have not become effect. The 0.025 MGD loading limits of 2800 g/d monthly average 4300 g/d have been carried forward from the previous permit.

Biochemical Oxygen Demand (BOD₅), Dissolved Oxygen (DO) – Between June 2008 and November 2012, there were no exceedances of the BOD₅ limits. There has been no change in the low flow frequency (7Q10), but there is a lower 90th percentile effluent temperature value. The Regional Water Quality Water Quality Model for Free Flowing Streams (Version 4.10) was rerun with the revised temperature data. For the 0.025 MGD facility, a higher total kjeldahl nitrogen (TKN) corresponding to a new higher ammonia limit was used in the model run. Copies of the model output results are found in **Attachment F**.

For the existing 0.0048 MGD facility, an initial DO concentration of 0 mg/L, a TKN value of 20 mg/L, and a secondary treatment limit of 30 mg/L for BOD₅ were used in the model input. The model predicted a DO sag at the initial discharge point to 7.793 mg/L.

The stream background concentration is 7.931 mg/L. The regional water quality model output indicates that more stringent limits than the federal secondary treatment guidelines are not necessary for BOD₅ because DO was not predicted to drop below the water quality criteria of 5.0 mg/L. Additionally, limits are not needed for DO or TKN. The BOD₅ concentration limits of 30 mg/L monthly average and 45 mg/L weekly average for the 0.0048 MGD facility have been continued from the previous permit. The calculated loading limits using two significant figures are higher than the previous permit. The loading limits for the 0.0048 MGD facility were previously given as one significant figure. In accordance with current Agency guidance, the 0.0048 MGD loading limits have been revised as 540 g/d monthly average and 870 g/L weekly average to reflect two significant figures. In accordance with 9 VAC 25-31-220L.2(2), Section 402(3) of the Clean Water Act, and 40 CFR Section 122.62, backsliding on these technology based loading limits to correct a technical error is allowed.

For the 0.0066 MGD facility, an initial DO concentration of 0 mg/L, a TKN value of 20 mg/L, and a secondary treatment limit of 30 mg/L for BOD₅ were used in the model input. Given the low level of dilution, the baseline DO concentration in the stream is assumed to not differ significantly from the background concentration of the stream. For the 0.0066 MGD facility, the model predicted a DO sag at the initial discharge point to 7.742 mg/L. The initial drop of 0.109 mg/L from the stream background (7.931 mg/L) is smaller than the 0.20 mg/L drop allowed by antidegradation policy. Thus, no DO or TKN effluent limitations are needed to prevent degradation of the receiving stream. Secondary treatment limits for BOD₅ are adequate because the dissolved oxygen level is not predicted to drop below 5.0 mg/L or violate antidegradation policy. The concentration BOD₅ limits of 30 mg/L monthly average and 45 mg/L weekly average for the 0.0066 MGD facility have been continued from the previous permit. The loading limits have been revised as 750 g/d monthly average and 1100 g/d weekly average to reflect two significant figures. Backsliding on these limits is allowed because the limits for this proposed facility are not effective.

For the 0.025 MGD facility, an initial DO concentration of 5.5 mg/L, a TKN value of 16.31 mg/L, and a secondary treatment limit of 30 mg/L for BOD₅ were used in the model input. The TKN value of 16.31 mg/L was determined by adding 3 mg/L to the new ammonia limitation of 13.31 mg/L. The model predicted a DO sag at the initial discharge point to 7.725 mg/L. The initial drop of 0.206 mg/L from the stream background is larger than the 0.20 mg/L drop allowed by antidegradation policy. When the initial DO concentration was increased to 5.6 mg/L, the model predicted a DO sag concentration of 7.734 mg/L. This initial drop of 0.197 mg/L from the baseline value is smaller than the 0.20 mg/L drop allowed by antidegradation policy. Thus, secondary treatment limits for BOD₅ found in the previous permit of 30 mg/L (2800 g/d) monthly average and 45 mg/L (4300 g/d) weekly average and a more stringent minimum DO limit of 5.6 mg/L are required.

Discharge Data Input*			Model Output		
BOD ₅ (mg/L)	TKN (mg/L)	DO (mg/L)	DO Sag (mg/L)	DO Drop (mg/L)	Antidegradation Violated?
10	16.31	5.2	7.700	0.231	yes
30	16.31	5.5	7.725	0.206	yes
25	16.31	5.5	7.725	0.206	yes
30	16.31	5.6	7.734	0.197	no

(*initial temperature conditions -- effluent 12.2 °C, stream 19.6 °C)
(background DO 7.931 mg/L)

Attachment G includes a summary of TKN and ammonia as N data collected from the pilot IFAS demonstration project treatment system. These data indicate an average difference between TKN concentration and ammonia as N concentration of 1.410 mg/L. The TKN input for the regional model assumed a corresponding TKN of 16.31 mg/L for an ammonia limit of 13.31 mg/L. Therefore, the ammonia as N limit of 13.31 mg/L for the 0.025 MGD facility will be adequate to prevent exceedances of the TKN value used in the model.

The BOD₅ monitoring frequency for the 0.0048 MGD, 0.0066 MGD, and 0.025 MGD facilities shall continue to be monitored 1/month via grab samples. The DO monitoring frequency for the 0.025 MGD facility shall be 1/day via grab samples.

E. coli – The permittee submitted results for 12 *E. coli* samples collected in April 2006 and May 2006. Chlorine contact data and effluent data were also submitted in conjunction with the *E. coli* data. The *E. coli* data ranged from 1 to 49 cfu/100 mL which is well below the water quality criteria for *E. coli*.

A Total Daily Maximum Load (TMDL) report for the Staunton (Roanoke) River Watershed was approved by the EPA on June 22, 2006 and the State Water Control Board on June 27, 2007. This document included an *E. coli* wasteload allocation for Woodhaven Nursing Home STP of 8.36E+09 cfu/year. This WLA is equivalent to the facility discharging at its current design flow (0.0048 MGD) and an *E. coli* limit of 126 cfu/100 mL. In accordance with the VPDES Permit Manual, an *E. coli* limit shall be included in permits that have approved TMDLs with wasteload allocations.

A monthly average limit of 126 cfu/100 mL (geometric mean) has been included in the permit as a means of verifying that the facility is complying with the TMDL wasteload allocation. One month out of the year samples (four weekly) will be collected to provide sufficient data to calculate a geometric mean.

In the event that the facility does not use chlorine disinfection, Part I.B of the permit requires weekly *E. coli* monitoring. The definition of geometric mean given in the Water

Quality Standards, 9 VAC 25-260-170 has recently been revised to indicate that the geometric mean "shall be calculated using all data collected during any calendar month with a minimum of four weekly samples. If there are insufficient data to calculate a monthly geometric mean..., no more than 10% of the total samples in the assessment period shall exceed 235 cfu/100 mL for *E. coli*."

C. Effluent Limitations for Toxic Pollutants

Total Residual Chlorine (TRC) — The 0.0048 MGD facility uses chlorine as a disinfectant and ultraviolet light is proposed for disinfection for the 0.0066 MGD and 0.025 MGD facilities. In case chlorine disinfection is needed for the 0.0066 MGD or 0.025 MGD facilities, alternative chlorine limitations are included in Part I.C. When chlorine is used for disinfection, grab samples are required once per day. In accordance with the current permit guidance, limits are expressed as numerical values even if below the detection limit.

For the 0.0048 MGD facility, the wasteload allocations for TRC have not changed. Based on the WLAs and the Agency's STATS program output, the permit limits of 0.12 mg/L monthly average and 0.14 mg/L weekly average have been continued from the previous permit. See **Attachment H** for the wasteload allocation spreadsheet and STATS program output.

For the 0.0066 MGD facility, the antidegradation wasteload allocations for TRC have not changed. Based on the AWLAs and the Agency's STATS program output, the permit limits of 0.087 mg/L monthly average and 0.10 mg/L weekly average have been continued from the previous permit. See **Attachment H** for the wasteload allocation spreadsheet and STATS program output.

For the 0.025 MGD facility, the antidegradation wasteload allocations for TRC have not changed. Based on the AWLAs and the Agency's STATS program output, the permit limits of 0.023 mg/L monthly average and 0.028 mg/L weekly average have been continued from the previous permit. See **Attachment H** for the wasteload allocation spreadsheets and STATS program outputs.

Ammonia as N — Since 90th percentile effluent pH data have changed from the previous reissuance, the need for ammonia limitations has been reevaluated. Since the ammonia limits for the 0.025 MGD proposed facilities are not effective, they are not subject to antibacksliding restrictions.

The previous permit did not include an ammonia limitation for the 0.0048 MGD facility. The discharge from the 0.0048 MGD facility is intermittent, so only the acute WLA was used in the calculations. To verify that a limit is still not needed for the 0.0048 MGD facility, the acute wasteload allocation and a default value of 9.0 mg/L were entered into

the Agency's STATS program. The STATS program indicated that ammonia limitations are not needed for the 0.0048 MGD facility. For the 0.0066 and the 0.025 MGD facility, acute and chronic antidegradation wasteload allocations and a default value of 9.0 mg/L were entered into the STATS program. The program indicated that permit limits are not needed for the 0.0066 MGD facility.

Since the 0.025 MGD facility has not been built, the limits for the 0.025 MGD facility are not subject to antibacksliding restrictions. For the 0.025 MGD facility, the STATS program indicated that permit limits of 13.31 mg/L for monthly average and 13.31 mg/L for weekly average are needed. These limits replace the less stringent ammonia limits for the 0.025 MGD facility found in previous permit. Monitoring for the 0.025 MGD facility shall continue once per month via grab samples. See **Attachment H** for the wasteload allocation spreadsheets and STATS program outputs.

Temperature – Daily temperature monitoring is being required in the reissued permit. These data will be reported as a maximum daily average for the purposes of calculating the 90th percentile effluent temperature for the wasteload allocation spreadsheets and the Regional Water Quality Model. The temperature water quality criteria as per 9 VAC 25-260-50 for this Class III receiving stream is 32 °C.

17. **Basis for Sludge Use and Disposal Requirements:** Since the facility will pump and haul sludge to a POTW, there are no sludge limits or monitoring requirements.
18. **Antibacksliding Statement:** The Total Suspended Solids (TSS) loadings for the 0.0048 MGD facility are less stringent than the previous permit. To be consistent with current Agency Guidance, TSS and BOD₅ loading limits have been revised from one significant figure to two significant figures. Backsliding on these BOD₅ loadings to correct technical errors is allowed pursuant to 9 VAC 25-31-220L.2(2), Section 402(3) of the Clean Water Act, and 40 CFR Section 122.62. Also, the TSS and BOD₅ loading limits for the 0.0066 MGD facility are less stringent than the previous permit. The 0.0066 MGD facility has not been built, so the limits are not effective. Thus, the limits for the 0.0066 MGD facility are not subject to antibacksliding restrictions.

The ammonia limits for the 0.025 MGD facility are less stringent than the previous permit. The 0.025 MGD facility has not been built, so the limits are not effective. Thus, the limits for the 0.025 MGD facility are not subject to antibacksliding restrictions. No other limitations are less stringent than the previous permit. So, the permit limits comply with the antibacksliding requirements of 9 VAC 25-31-220 L of the VPDES Permit Regulation.
19. **Compliance Schedules:** The permit does not contain a compliance schedule.
20. **Special Conditions:** A brief rationale for each special condition contained in the permit is given below.

A. Additional Total Residual Chlorine (TRC) Limitations and Monitoring Requirements – 0.0048 MGD Facility (Part I.B)

Rationale: This condition establishes TRC concentration limits after chlorine contact and final TRC effluent limitations and monitoring requirements. This condition is required by the Sewage Collection and Treatment Regulations, 9 VAC 25-790, and is in accordance with chlorine criteria in 9 VAC 25-260-140 of the VPDES Permit Regulation. Also, 40 CFR 122.41 (e), requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. These requirements ensure proper operation of chlorination equipment to maintain adequate disinfection.

B. Total Residual Chlorine (TRC) Limitations and Monitoring Requirements – 0.0066 MGD Facility and 0.025 MGD Facility (Part I.C)

Rationale: Should the permittee elect to disinfect by chlorine rather than UV light, this condition establishes TRC concentration limits after chlorine contact and final TRC effluent limits and monitoring requirements. This condition is required by Sewerage Regulations, 9 VAC 25-60-820, and is in accordance with chlorine criteria in 9 VAC 25-260-140 of the VPDES Permit Regulation. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. These requirements ensure proper operation of chlorination equipment to maintain adequate disinfection.

C. *E. coli* Monitoring Requirements – 0.0066 MGD Facility and 0.025 MGD Facility (Part I.D)

Rationale: The Water Quality Standards, 9 VAC 25-260-170 establishes bacteria water quality standards. The standard set bacteria monitoring requirements. This special condition is needed to describe requirements for when there are insufficient data (four samples) to calculate a monthly geometric mean.

D. Compliance Reporting (Part I.E.1)

Rationale: In accordance with VPDES Permit Regulation, 9 VAC 25-31-190 J4 and 220 I, DEQ is authorized to establish monitoring methods and procedures to compile and analyze data on water quality. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. This condition also establishes protocols for calculation of reported values.

E. 95% Capacity Reopener (Part I.E.2)

Rationale: This condition requires that the permittee address problems resulting from high influent flows, in a timely fashion, to avoid non-compliance and water quality problems from plant overloading. This condition is required by 9 VAC 25-31-200 B4 for all POTW and PVOTW permits.

F. CTC, CTO Requirement (Part I.E.3)

Rationale: This condition is required by Code of Virginia § 62.1-44.19 and the Sewage Collection and Treatment Regulations, 9 VAC 25-790.

G. Operations and Maintenance Manual Requirement (Part I.E.4)

Rationale: An Operations and Maintenance Manual is required by the Code of Virginia Section 62.1-44.19; the Sewage Collection and Treatment Regulations, 9 VAC 25-790; and the VPDES Permit Regulation, 9 VAC 25-31-190 E.

H. Licensed Operator Requirement (Part I.E.5)

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 C and the Code of Virginia § 54.1-2300 et seq., Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.), require licensure of operators. A Class III operator is required for the 0.0066 MGD facility and the 0.025 MGD facility. A licensed operator requirement has not been included for the 0.0048 MGD.

I. Reliability Class (Part I.E.6)

Rationale: A Reliability Class III has been assigned to the 0.0048 MGD facility. A Reliability Class II has been assigned to the 0.0066 MGD facility and the 0.025 MGD facility. Reliability class designations are required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities.

J. Sludge Reopener (Part I.E.7)

Rationale: This condition is required by VPDES Permit Regulation, 9 VAC 25-31-220 C for all permits issued to treatment works treating domestic sewage to allow incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the Clean Water Act.

K. Sludge Use and Disposal (Part I.E.8)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B2; and 420 and 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for

sludge use and disposal. Technical requirements may be derived from the VPA Permit Regulation, 9 VAC 5-32-10 et seq. This special condition, in accordance with Guidance Memo 97-004, clarifies that the Sludge Management Plan approved with the reissuance of the permit is an enforceable condition of the permit.

L. Total Maximum Daily Load (TMDL) Reopener (Part I.E.9)

Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

M. Treatment Works Closure Plan (Part I.E.10)

Rationale: In accordance with State Water Control Law § 62.1-44.19, this condition is used to notify the owner of the need for a closure plan where a treatment works is being replaced or is expected to close.

N. Permit Application Requirement (Part I.E.11)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100.D and 40 CFR 122.21(d)(1) require submission of a new application at least 180 days prior to expiration of the existing permit. In addition, the VPDES Permit Regulation, 9 VAC 25-31-100 E.1 and 40 CFR 122.21 (e)(1) note that a permit shall not be issued before receiving a complete application.

O. Conditions Applicable to All VPDES Permits (Part II)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. Changes to the Permit:

A. Special conditions that have been modified from the previous permit are listed below: (The referenced permit sections are for the new permit.)

1. The Additional Total Residual Chlorine Limitations and Monitoring Requirements – 0.0048 MGD Facility Special Condition (Part I.B) has been revised to reflect changes in the Water Quality Standards.

2. The Operations and Maintenance Manual Special Condition (Part I.E.4) has been revised in accordance with the DEQ Agency guidance.

B. New special conditions added to the permit are listed below:

1. An *E. coli* Monitoring Requirements – 0.0066 MGD Facility and 0.025 MGD Facility Special Condition (Part I.D) has been added to comply with the Water Quality Standards 9 VAC 25-260-170 for when there are insufficient data (four samples) to calculate a monthly geometric mean.
2. A Permit Application Requirement Special Condition (Part I.E.11) has been added to provide the specific due date for the required submittal of the application.

C. Permit Limits and Monitoring Requirements: See Table III on pages 22-23 for details on changes to the effluent limits and monitoring requirements.

22. **Variances/Alternate Limits or Conditions:** No variances or alternate limits or conditions are included in this permit. For the application, the permittee requested a waiver to allow the submission of previously collected *E. coli* data in lieu of fecal coliform data. The permittee had previously requested that grab analysis data for TSS and BOD₅ collected during the permit term be used in the application in lieu of composite samples. These waivers were consistent with current permit requirements, and therefore they were granted.

For the reissuance, the permittee submitted a letter, dated October 19, 2012, requesting that PCB monitoring not be required. The permittee noted there are no known sources of PCBs at the Woodhaven Nursing Home STP. The discharge from Woodhaven Nursing Home STP is located in the watershed TMDL study area, but a PCB TMDL allocation has not been assigned to this facility and there is no reason to believe the facility contributes to PCB contamination in the watershed. Therefore, the reissuance permit will not require PCB monitoring.

23. **Regulation of Treatment Works Users (9 VAC 25-31-280 B9):** VPDES Permit Regulation 9 VAC 25-31-280 B9 requires that every permit issued to a treatment works owned by a person other than a state or municipality provide an explanation of the Board's decision on the regulation of users. There are no industrial users contributing to the treatment works.

24. **Public Notice Information required by 9 VAC 25-31-290 D:**

All pertinent information is on file and may be inspected, and copied by contacting Becky L. France at:

Virginia DEQ, Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, VA 24019
540-562-6700
becky.france@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for the comments. Only those comments received within this period will be considered.

The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state (1) the reason why a hearing is requested; (2) a brief informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and (3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the Blue Ridge Regional Office in Roanoke by appointment. A copy of the public notice is found in **Attachment I**.

25. **303(d) Listed Segments (TMDL):** This facility discharges directly to an unnamed tributary to the South Fork of Goose Creek. The stream segment receiving the effluent is not listed on the 303(d) list. However, the discharge is located in the Upper Goose Creek Watershed, and a bacteria total maximum daily load (TMDL) was developed for this watershed and approved by EPA on June 22, 2006 and the State Water Control Board on June 27, 2007. This facility was assigned an *E. coli* wasteload allocation (WLA) of $8.36E+09$ cfu/year. This WLA is based upon the facility discharging at the design flow of 0.048 MGD with an *E. coli* geometric average limit of 126 cfu/100 mL. The application includes a proposal for expanded facilities with design flows of 0.0066 MGD and 0.025 MGD. The calculated wasteload allocation for the 0.0066 MGD flow is $3.97E+10$ cfu/year. The calculated wasteload allocation for the 0.025 MGD flow is $7.17E+10$ cfu/year. The permit expansion WLA is accommodated by the TMDL WLA future growth as originally modeled. Sufficient future growth is present in the modeled expanded WLA to accommodate these actions. The allocations will be revised and published in the next TMDL modification. This permit's *E. coli* limit (geometric mean of 126/100 mL) agrees with the bacteria water quality criteria in 9 VAC 25-260-170 on which TMDL allocations are based. See **Attachment E** for selected pages from the TMDL document.

Various segments of the Roanoke River watershed are impaired for PCBs in fish tissue. Goose Creek and its tributaries are not PCB impaired. The current version of the Staunton River PCB TMDL does not include a wasteload allocation for the facility. The facility submitted with the reissuance application an exception request from PCB monitoring per Guidance Memo 09-2001. The request is granted and PCB monitoring for TMDL development is not included in this permit.

26. **Additional Comments:**

- A. **Reduced Effluent Monitoring:** Guidance Memo 98-2005 allows for reduced monitoring at facilities with excellent compliance histories. To qualify for consideration of reduced monitoring, the facility should not have been issued any Letter of Noncompliance (LON), Notice of Violation (NOV), or Warning Letter, or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years.

The facility received the following Notice of Violation (NOV) reports within the past three years:

Warning Letter No. W2011-07-W-1003	BOD ₅ and TSS not reported for May 2011
Warning Letter No. OWPCA-11-008	unpaid annual maintenance fees due 10/1/08 and 10/1/09

The facility does not meet the criteria discussed above, and therefore is not eligible for reduced monitoring.

- B. **Previous Board Action:** None
- C. **Staff Comments:** The discharge is not controversial. The discharge is in conformance with the existing planning document for the area.
- D. **Public Comments:** No comments were received during the public comment period.

E. **Tables**

Table I	Discharge Description (Page 2)
Table II	Basis for Monitoring Requirements (Pages 19-21)
Table III	Permit Processing Change Sheet (Paged 22-23)

F. **Attachments**

- A. Flow Frequency Memorandum
- B. Wastewater Process Information
- Wastewater Schematics
 - Process Description
- C. Site Inspection Report
- D. USGS Topographic Map
- E. Ambient Water Quality Information
- STORET Data (Station 4AGSF002.16)
 - 2010 Impaired Waters Summary (Excerpt)
 - Bacteria TMDLs for Staunton (Roanoke) River (Excerpt)

- F. Regional Dissolved Oxygen Model Outputs (Version 4.10)
 - Map of Model Segments and Drainage Areas
 - 0.0048 MGD Facility
 - Regional Model Calculations
 - Regional Model Input Summary
 - Model Output (BOD₅=30 mg/L, TKN=20 mg/L, DO=0 mg/L)
 - 0.0066 MGD Facility
 - Regional Model Calculations
 - Regional Model Input Summary
 - Model Output (BOD₅=30 mg/L, TKN=20 mg/L, DO=0 mg/L)
 - 0.025 MGD Facility
 - Regional Model Calculations
 - Regional Model Input Summary
 - Model Outputs (BOD₅=30 mg/L, TKN=16.31 mg/L, DO=5.6 mg/L)
(BOD₅=30 mg/L, TKN=16.31 mg/L, DO=5.5 mg/L)
(BOD₅=25 mg/L, TKN=16.31 mg/L, DO=5.5 mg/L)
(BOD₅=10 mg/L, TRN=16.31 mg/L, DO=5.2 mg/L)
- G. Effluent Data
 - DMR Data
 - Ammonia Background Data
- H. Wasteload and Limit Calculations
 - 0.00048 MGD Facility
 - Mixing Zone Calculations (MIXER 2.1)
 - Wasteload Allocation Spreadsheet
 - STATS Program Results (TRC, Ammonia)
 - 0.0066 MGD Facility
 - Mixing Zone Calculations (MIXER 2.1)
 - Antidegradation Wasteload Allocation Spreadsheet
 - STATS Program Results (TRC, Ammonia)
 - 0.025 MGD Facility
 - Mixing Zone Calculations (MIXER 2.1)
 - Antidegradation Wasteload Allocation Spreadsheet
 - STATS Program Results (TRC, Ammonia)
- I. Public Notice
- J. EPA Checksheet

Table II-1
BASIS FOR LIMITATIONS – MUNICIPAL

() Interim Limitations
(x) Final Limitations

OUTFALL: 001
DESIGN CAPACITY: 0.0048 MGD

Effective Dates - From: Effective Date
To: Expiration Date or 0.0066 MGD

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/Day	Estimate
pH (Standard Units)	1,2	NA	NA	6.0	9.0	1/Day	Grab
BOD ₅	1	30 mg/L 540 g/d	45 mg/L 870 g/d	NA	NA	1/Month	Grab
Total Suspended Solids	1	30 mg/L 540 g/d	45 mg/L 870 g/d	NA	NA	1/Month	Grab
Total Residual Chlorine	2	0.12 mg/L	0.14 mg/L	NA	NA	1/Day	Grab
Temperature	2	NA	NA	NA	NL °C	1/Day	IS
<i>E. coli</i> (cfu/100 mL)	2,4	126 (geometric mean)	NA	NA	NA	1/Year*	Grab

NA = Not Applicable

NL = No Limitations; monitoring only

IS = immersion stabilization

*collect one sample per week for four weeks

The basis for the limitations codes are:

1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Regional Water Quality Model
4. TMDL Wasteload Allocation (Staunton River)

Table II-2
BASIS FOR LIMITATIONS – MUNICIPAL

() Interim Limitations
(x) Final Limitations

OUTFALL: 001
DESIGN CAPACITY: 0.0066 MGD

Effective Dates - From: Upgrade to 0.0066 MGD
To: Expiration Date or Upgrade to 0.025 MGD

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/Day	Estimate
pH (Standard Units)	1,2	NA	NA	6.0	9.0	1/Day	Grab
BOD ₅	1	30 mg/L 750 g/d	45 mg/L 1100 g/d	NA	NA	1/Month	Grab
Total Suspended Solids	1	30 mg/L 750 g/d	45 mg/L 1100 g/d	NA	NA	1/Month	Grab
Temperature	2	NA	NA	NA	NL°C	1/Day	IS
<i>E. coli</i> (cfu/100 mL)	2,4	126 (geometric mean)	NA	NA	235	1/Week	Grab

NA = Not Applicable

IS = immersion stabilization

NL = No Limitations; monitoring only

The basis for the limitations codes are:

1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Regional Water Quality Model
4. TMDL Wasteload Allocation (Staunton River)

Table II-3
BASIS FOR LIMITATIONS – MUNICIPAL

() Interim Limitations
(x) Final Limitations

OUTFALL: 001
DESIGN CAPACITY: 0.025 MGD

Effective Dates - From: Upgrade to 0.0025 MGD
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/Day	Estimate
pH (Standard Units)	1,2	NA	NA	6.0	9.0	1/Day	Grab
BOD ₅	1	30 mg/L 2800 g/d	45 mg/L 4300 g/d	NA	NA	1/Month	Grab
Total Suspended Solids	1	30 mg/L 2800 g/d	45 mg/L 4300 g/d	NA	NA	1/Month	Grab
Dissolved Oxygen	2,3	NA	NA	5.6 mg/L	NA	1/Day	Grab
Ammonia as Nitrogen	2	13.31 mg/L	13.31 mg/L	NA	NA	1/Month	Grab
Temperature	2	NA	NA	NA	NL °C	1/Day	IS
<i>E. coli</i> (cfu/100 mL)	2,4	126 (geometric mean)	NA	NA	235	1/Week	Grab

NA = Not Applicable
NL = No Limitations; monitoring only

IS = immersion stabilization

The basis for the limitations codes are:

1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Regional Water Quality Model
4. TMDL Wasteload Allocation (Staunton River)

Table III-1
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	<i>E. coli</i> (applicable if TRC is used for disinfection)	NA	1/Year (1/Week for 4 weeks)	NA	0.0048 MGD Facility- 126 cfu/100 mL (geometric mean) based on 4 weekly samples	Monitoring and limit needed to demonstrate compliance with bacteria TMDL wasteload allocation for this facility.	1/22/13
001	<i>E. coli</i> (applicable only if TRC not used for disinfection)	1/Month	1/Discharge-Week	126 N/100 ml (geometric mean)	0.0048 MGD Facility- 126 cfu/100 mL (geometric mean) or 235 cfu/100 mL maximum	Monitoring increased because the water quality standards regulation defines that four samples are needed to calculate the geometric mean for <i>E. coli</i> . In the event that four samples are not collected the maximum limit would be applicable instead of the geometric mean limit.	1/22/13
001	Temperature 0.0048, 0.0066, 0.025 MGD Facilities	NA	1/Day	NA	NL °C daily maximum	Effluent temperature monitoring required to provide data used in calculation of wasteload allocations and water quality model.	1/22/13
001	<i>E. coli</i> (0.066, 0.025 MGD Facilities)			126 cfu/100 mL (geometric mean)	126 cfu/100 mL (geometric mean) or 235 N/100 mL maximum	Water Quality Standards revised to require geometric mean to be calculated from 4 samples. Alternative maximum limit applies if less than 4 samples collected during the month.	1/22/13
001	Ammonia as Nitrogen			0.025 MGD Facility - 6.9 mg/L monthly average and 6.9 mg/L weekly average	0.025 MGD Facility- 13.31 mg/L monthly average and 13.31 mg/L weekly average	Due to revisions in the water quality standards for ammonia, STATS program indicated less stringent limits needed. Backsliding allowed because limits for proposed facility not in effect.	1/22/13
001	Dissolved Oxygen 0.025 MGD Facility			5.2 mg/L minimum daily	5.6 mg/L minimum daily	New temperature data used in regional model indicated a higher minimum dissolved oxygen limit is needed for the proposed facility.	1/22/13

Table III-2
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall I No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Total Suspended Solids (TSS) and BOD ₅ (0.0048 MGD Facility)			30 mg/L (500 g/d) monthly average; 45 mg/L (800 g/d) weekly average	30 mg/L (540 g/d) monthly average; 45 mg/L (870 g/d) weekly average	To be consistent with current Agency Guidance, loadings revised from one significant figure to two significant figures. Backsliding on these TSS loadings is allowed pursuant to 9 VAC 25-31-220L.2(2), Section 402(3) of the Clean Water Act, and 40 CFR Section 122.62.	2/5/13
001	Total Suspended Solids (TSS) and BOD ₅ (0.0066 MGD Facility)			30 mg/L (700 g/d) monthly average; 45 mg/L (1100 g/d) weekly average	30 mg/L (750 g/d) monthly average; 45 mg/L (1100 g/d) weekly average	To be consistent with current Agency Guidance, loadings have been revised from one significant figure to two significant figures. These limits are not subject to antibacksliding restrictions because they have not become effective.	2/5/13

Attachment A

Flow Frequency Memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
3019 Peters Creek Road Roanoke, Virginia 24019

SUBJECT: Flow Frequency Determination
Woodhaven Nursing Home STP, VA0074870

TO: Permit File

FROM: Becky L. France, Water Permit Writer *BLF*

DATE: December 29, 2012

Woodhaven Nursing Home STP discharges to an unnamed tributary of the South Fork of Goose Creek near Villamont, Virginia. Stream flow frequencies are required at this site to develop effluent limitations for the VPDES permit.

The DEQ conducted several flow measurements on this tributary to the South Fork Goose Creek from 1996 to 1999. The measurements were made just upstream from the nursing home outfall. The measurements correlated very well with the same day daily mean values from the continuous record gauge on Tinker Creek near Daleville, Virginia #02055100. The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies from the reference gauge were plugged into the equation for the regression line and the associated flow frequencies at the discharge point were calculated. The high flow months are January through May. Flow frequencies for the reference gauge, the measurement site, and the discharge point are listed on the attached tables.

Woodhaven Nursing Home withdraws water for use by the facility from a spring located approximately 300 feet upstream of the discharge point. It is assumed that the site specific stream measurements were made downstream of the withdrawal, so adjustments in the calculated regression equation outfall values are not needed.

Reference Gauge (data from 1956 to 2011)					
Tinker Creek near Daleville, VA (#02055100)					
Drainage Area [mi ²] =		11.7	mi ²		
	ft ³ /s	MGD		ft ³ /s	MGD
1Q10 =	0.97	0.63	High Flow 1Q10 =	2.3	1.49
7Q10 =	1.04	0.67	High Flow 7Q10 =	2.6	1.68
30Q5 =	1.68	1.09	High Flow 30Q10 =	3.2	2.07
30Q10 =	1.26	0.81	HM =	5	3.23

Flow frequencies from Regression Analysis					
S.F. Goose Creek Trib No.1 above Woodhaven near Villamont, VA (#02059440)					
Drainage Area [mi ²] =		0.31	mi ²		
	ft ³ /s	MGD		ft ³ /s	MGD
1Q10 =	0.41	0.27	High Flow 1Q10 =	0.49	0.32
7Q10 =	0.42	0.27	High Flow 7Q10 =	0.50	0.33
30Q5 =	0.46	0.30	High Flow 30Q10	0.53	0.34
30Q10 =	0.44	0.28	HM =	0.57	0.37

Flow Frequency Determination Memorandum
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South Fork Goose Creek Trib No. 1 above Woodhaven Nursing Home near Villamont #02059440
vs Tinker Creek near Daleville #02055100

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.990348929
R Square	0.980791001
Adjusted R Square	0.974388001
Standard Error	0.016214965
Observations	5

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.040274025	0.040274	153.1768	0.001136495
Residual	3	0.000788775	0.000263		
Total	4	0.0410628			

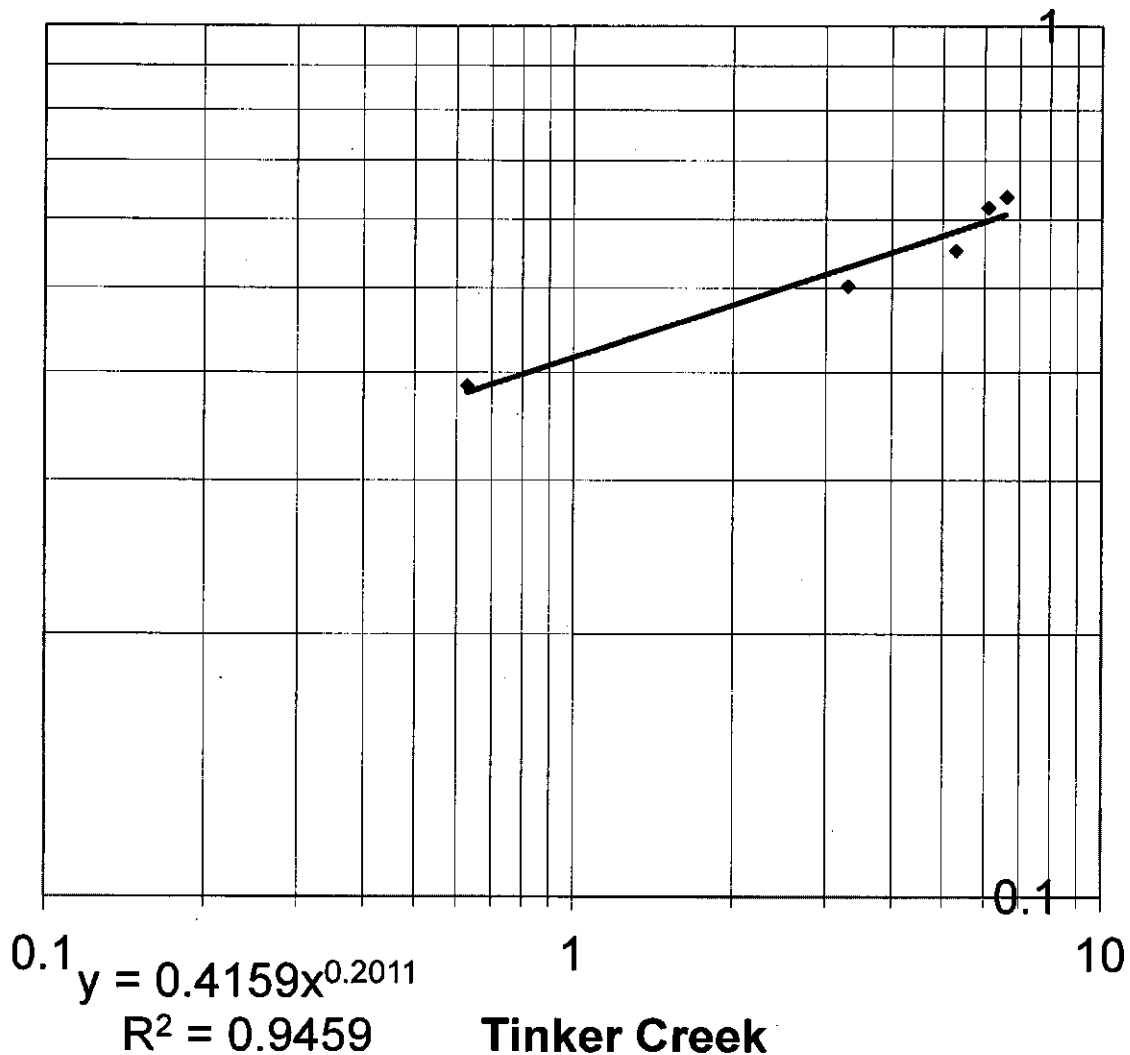
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.359987311	0.016237774	22.16974	0.000201	0.308311418	0.4116632	0.308311418	0.4116632
X Variable 1	0.040996965	0.003312495	12.37646	0.001136	0.030455118	0.05153881	0.030455118	0.05153881

RESIDUAL OUTPUT

<i>Observation</i>	<i>Predicted Y</i>	<i>Residuals</i>
1	0.577271226	-0.024271226
2	0.610068798	0.009931202
3	0.630567281	0.006432719
4	0.495277296	0.007722704
5	0.385815399	0.000184601

**S. F. Goose Creek Trib No. 1 above Woodhaven Nursing Home near Villamont, VA (#02059440)
vs Tinker Creek near Daleville, VA (#02055100)**

S. F. Goose Creek Tributary



<u>Flow Data (cfs)</u>		
<u>Date</u>	<u>Tinker</u>	<u>SF Goose</u>
7/10/1996	5.3	0.553
8/21/1996	6.1	0.62
5/21/1997	6.6	0.637
10/24/1997	3.3	0.503
8/12/1999	0.63	0.386

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.99034893
R Square	0.980791
Adjusted R Square	0.974388
Standard Error	0.01621497

Observations 5

<u>Flow Frequencies (cfs)</u>		
<u>Tinker</u>		<u>SF Goose</u>
0.97	1Q10	0.413
1.04	7Q10	0.419
1.68	30Q5	0.462
1.26	30Q10	0.436
2.3	HF 1Q10	0.492
2.6	HF 7Q10	0.504
5.0	HM	0.575
3.2	HF30Q10	0.526
11.7 mi ²	DA	0.31 mi ²
	Jan-May	

Flow Frequency Determination Memorandum
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Lat 37 23'52", Long 79 45'07"

S. F. Goose Creek Trib No. 1, near Villamont, VA
Drainage Area 0.31 mi²

DEQ Station No.	Date	Flow cfs
02059440	7/10/1996	0.553
02059440	8/21/1996	0.62
02059440	5/21/1997	0.637
02059440	10/24/1997	0.503
02059440	8/12/1999	0.386

Tinker Creek near Daleville, VA
Drainage Area 11.7 mi²

USGS Station No.	Date	Mean Flow cfs
02055100	7/10/1996	5
02055100	8/21/1996	0.62
02055100	5/21/1997	0.637
02055100	10/24/1997	0.503
02055100	8/12/1999	0.386

Flow Frequency Determination Memorandum

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Gauging Station #02055100

Tinker Creek below railroad bridge near Daleville, VA

RECORD	DAAREA	HARMEAN	HF30Q10	HF7Q10	HF1Q10	Z30Q5	Z30Q10	Z7Q10	Z1Q10	Z1Q30	HEMTHS	STATPERIOD	YRSTRN
R, 1956-	11.7	5.0	3.2	2.6	2.3	1.68	1.26	1.04	0.97	0.65	JAN-MAY	1956-2011	2012

Attachment B

Wastewater Process Information

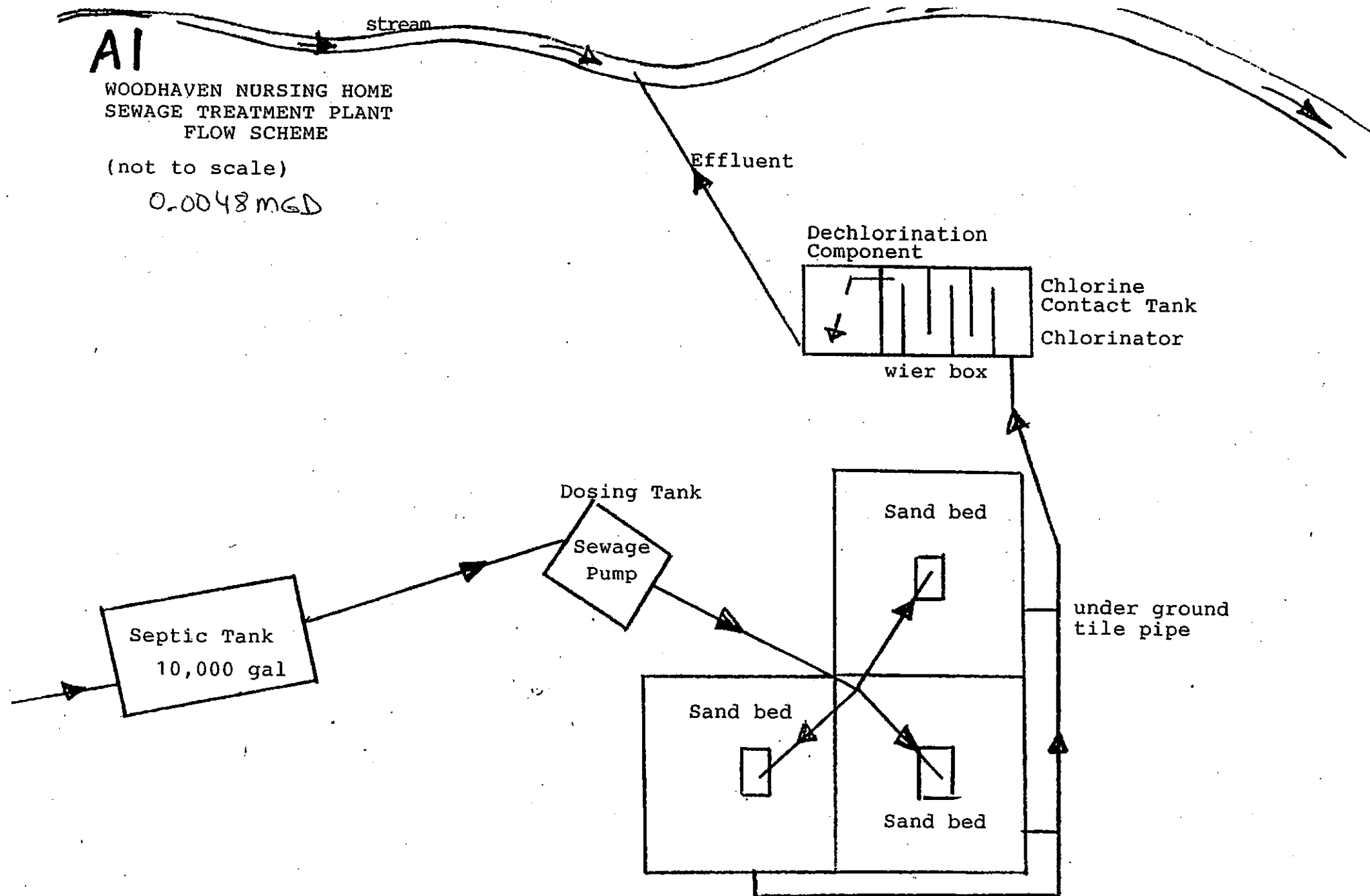
- **Wastewater Schematics**
- **Process Description**

AI

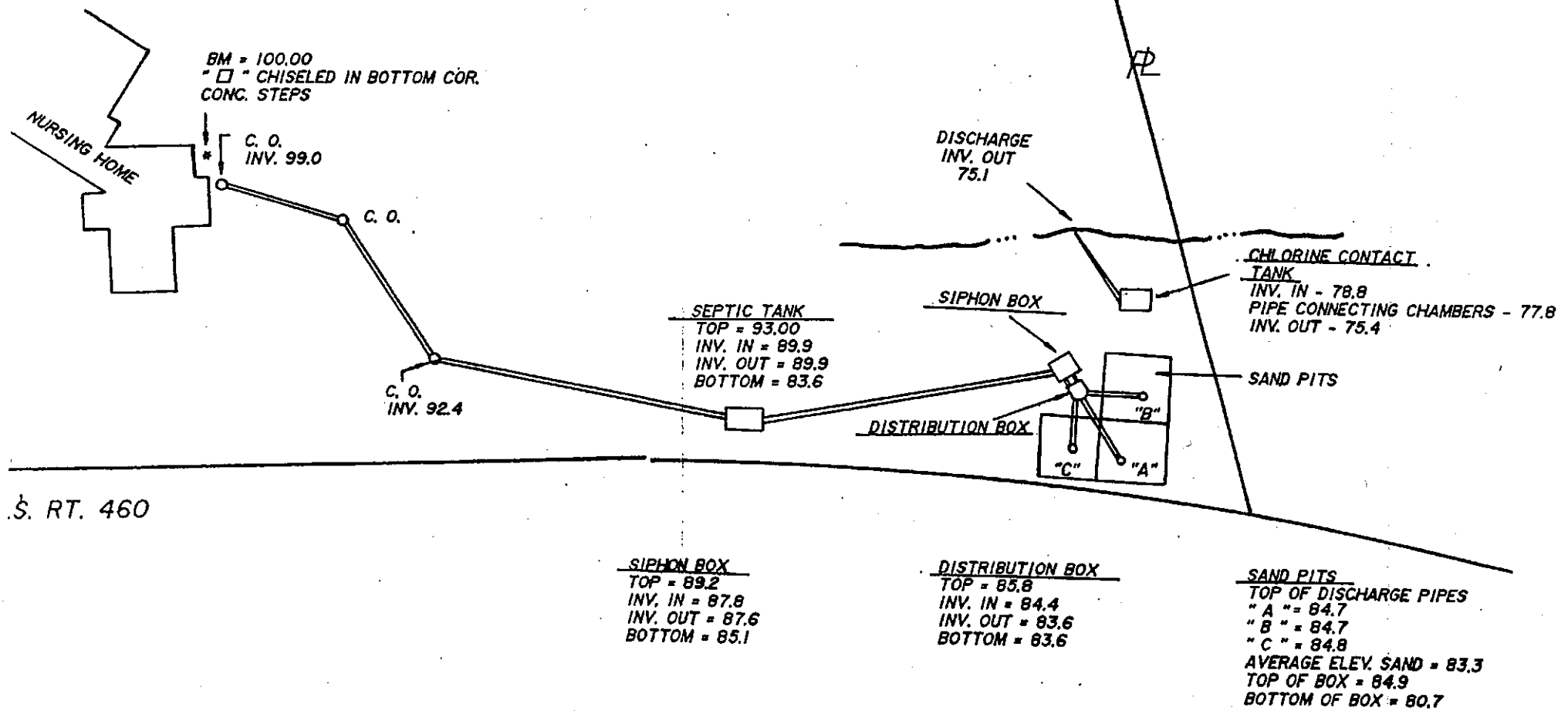
WOODHAVEN NURSING HOME
SEWAGE TREATMENT PLANT
FLOW SCHEME

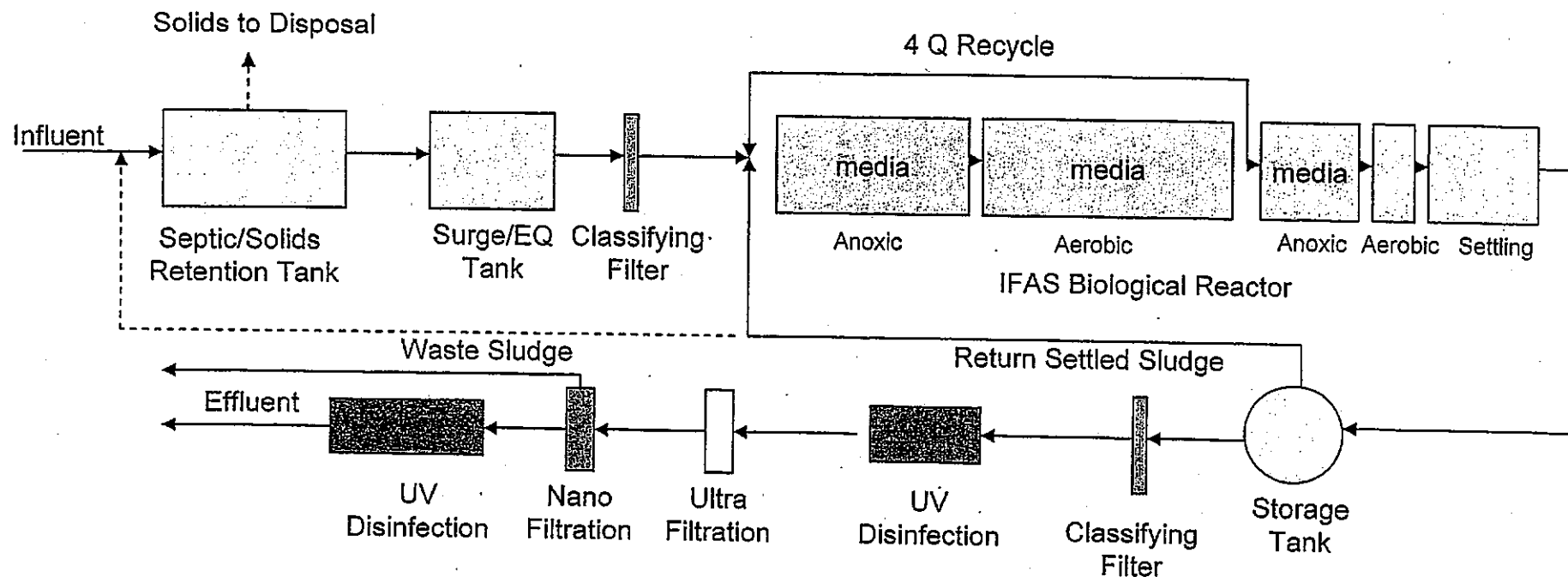
(not to scale)

0.0048 MGD



SKETCH SHOWING LOCATIONS
OF AND ELEVATIONS - WOODHAVE
SEWERAGE DISPOSAL SYSTEM
(NOT TO SCALE)





**Schematic Diagram of the Wastewater Conversion Technologies, Inc.
On-Site Wastewater Treatment Process**
(0.0066 MGD + 0.025 MGD)

DESIGN PROCESS

The entire treatment system is enclosed, eliminating access for vectors to any part of the treatment train. Other than the Septic/Solids Retention Tank and the Surge/EQ tank, the treatment system is housed in a temperature controlled steel structure. Those components not contained in this structure are buried below ground.

The treatment system contains no dewatering equipment. All settled biomass solids and all reject solids from the filters are recycled back to the septic/solids retention tank where they undergo anaerobic digestion. These collected solids are monitored via a specialized level transducer which tracks the volume of solids. When the solids level increases to a point that might cause carryover, they are pumped out and transported to a disposal plant or municipal wastewater treatment plant that accepts septage. All solids will be removed from the Septic/Solids Retention Tank using a vacuum septage truck and sent to appropriate disposal.

For a brief description, the raw wastewater enters the two-compartment Septic/Solids Retention Tank where the settleable solids are settled to the sludge blanket and the oil, grease and other floatables collect in a layer on the surface. The first compartment of the tank is $\frac{2}{3}$ of the total volume and is separated from the second compartment by a baffle wall that extends above the water surface and has an opening for forward flow located below at the mid liquid depth point. The effluent from the tank overflows without equalization, and then flows to a Surge/EQ tank where the flow is equalized. The equalization tank is maintained at 10% capacity, this allows a 90% reserve for flow irregularities and equipment maintenance problems. Total capacity is based on 24 to 36 hours total flow. Two redundant grinder pumps take the flow and pass it through a 120 micron pre-classification filter. The filter prevents the passage of large solids such as plastics, etc., to protect subsequent pumps and prevent any clogging of the media in the Biological Reactor. The filtered wastewater is then run through a thermostatically set heater so the Bioreactors can always be maintained at a temperature that will ensure efficient nitrification and denitrification. The Bioreactor is a Modified Bardenpho configuration biological nutrient removal process that contains plastic media similar to Kaldnes media, which has a specific surface area of 153 ft²/ft³ (500 m²/m³), so that all but the anaerobic zone and the last aerobic zone operate as Integrated Fixed-Film Activated Sludge (IFAS) reactors. This system is capable of performing Enhanced Biological Phosphorus Removal (EBPR), but typically will be operated only for enhanced nitrification and denitrification. Enhanced nitrification and denitrification are accomplished by the biofilms that grow on the IFAS media. The settling basin is an integral part of the Bioreactor, and its primary function is to settle the bulk of the mixed liquor biomass and recycle it to the influent of the Bioreactor, i.e. the anaerobic zone. The settling basin overflow goes to the Process Storage Tank where it is stored to minimize flow variations between the Bioreactors, and final filtration /polishing units. Solids in the process storage tank are collected with a 20 micron disk filter. When the filter is back-flushed, solids are sent back to the Bioreactors. When the Mixed Liquor Suspended Solids (MLSS) level needs to be lowered, a WAS valve is opened and these solids are sent to the solids retention tank. After the Disk Filter, the treated flow enters the 150,000 Dalton MWCO Ultrafilter, which removes any TSS that is remaining in the flow. The ultrafiltration membranes are NSF and SWTR approved by exhibiting over a Log 5 removal efficiency for bacteria and viruses, and reducing turbidity levels to < 0.06 NTU. Next the flow enters the first of two UV radiation units for disinfection/sterilization. This stage destroys fecal coliform, pathogens and retards microbial growth on the Activated Alumina columns. Each UV unit is rated at a minimum of 90,000

mg/cm² usually two to three times the required state regulation. There are three phosphorus removing Activated Alumina columns, but only two operate at a time so that the flow goes from the most saturated column to the least saturated column. This process maximizes utilization of the phosphorus removing capacity of the first column before it is taken off line for regeneration. This process also ensures that the effluent phosphorus concentration from the third column is below the breakthrough concentration, i.e. the effluent requirement. As the breakthrough concentration wave nears the end of the second column, the third or fresh column becomes the second column. Then the previous second column becomes the first column and the third column becomes the second. This cycling is continued. After the Activated Alumina columns, the treated flow is treated again by UV disinfection to assure that the effluent will contain no fecal coliforms or pathogens, and it is discharged for final disposal.

Attachment C
Site Inspection Report

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Site Inspection Report for Woodhaven Nursing Home STP
Reissuance of VPDES Permit No. VA0074870

TO: Permit File

FROM: Becky L. France, Water Permit Writer *BLF*

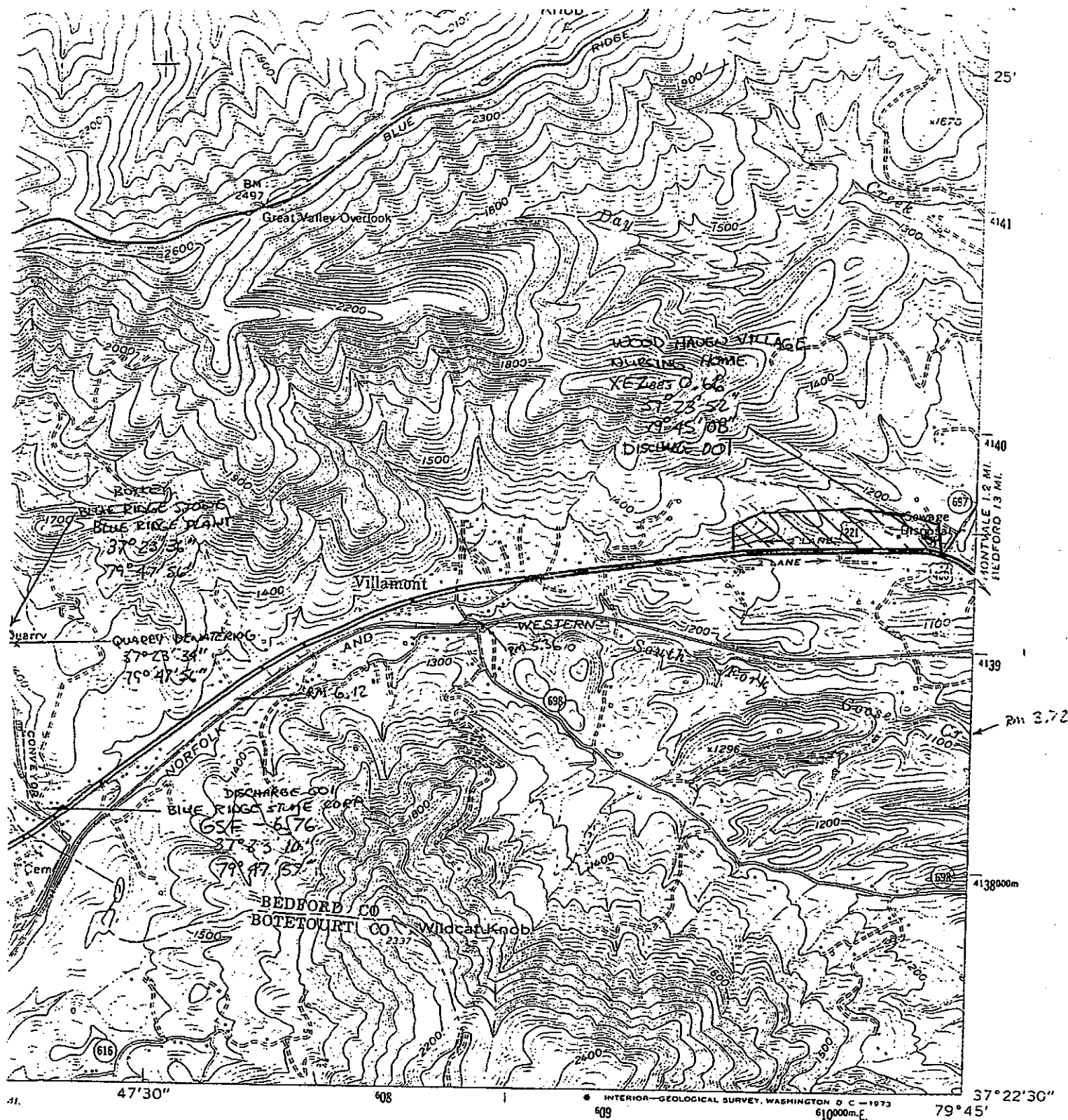
DATE: August 1, 2012

On July 18, 2012, a site inspection of the wastewater works for Woodhaven Nursing Home was conducted. Woodhaven Nursing Home is located off US 460 in the Villamont area of Bedford County. Drinking water is withdrawn from a spring upstream from the outfall to the treatment plant. Mr. David Graves, owner, was present at the site inspection. According to Mr. Graves, there are plans for a 40 unit assisted living facility addition which will include an additional 60 residents and 20 staff. This facility will result in a projected 25,000 gpd wastewater treatment design facility.

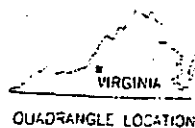
The current treatment works consists of a sand filter system with tablet chlorinator and tablet dechlorinator. The effluent flow is measured by a flow meter. There is a grease trap for the kitchen area which is checked as needed. Wastewater from the nursing home flows into a 5,500 gallon septic tank and then into a 10,000 gallon septic tank. The septic tanks are pumped periodically and the septage is hauled to the Western Virginia Water Authority WPCP. The wastewater flows from the last septic tank via gravity into a dosing tank. A high level float control activates pumping of the dosing tank to the sand filter beds. Currently, only one of the sand filter is used at a time. At the time of the site visit, there was no sign of vegetation in any of the sand filter beds. Each sand filter has three distribution pipes. Any solids skimmed from the surface of the sand filters are sent to the Bedford County Landfill.

From the sand filter, the wastewater is chlorinated by a tablet chlorinator and dechlorinated by a tablet dechlorinator. At the time of the site visit, one of the two chlorination tubes and two of the dechlorination tubes were being used. Chlorination (calcium hypochlorite) and dechlorination (sodium sulfite) tablets are stored in sealed pails in the disinfection unit. There is a screen to keep leaves out of the contract tank. Following dechlorination, the effluent is discharged to an intermittent tributary to the South Fork of Goose Creek. At the time of the site visit, there was flow in the receiving stream which was approximately 5 feet wide.

Attachment D
USGS Topographic Map



1 MILE
2 FEET
30



A 22903
EST

Revisions shown in purple compiled in cooperation with
Commonwealth of Virginia agencies from aerial photographs
taken 1972. This information not field checked

ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt ———
○ Interstate Route ○ U.S. Route ○ State Route

VILLAMONT, VA.

N3722.5—W7945/7.5

1963
PHOTOREVISED 1972
AMS 505R IV NE—SERIES V834

Attachment E

Ambient Water Quality Information

- **STORET Data (Station 4AGSF002.16)**
- **2010 Impaired Waters Summary
(Excerpt)**
- **Bacteria TMDLs for Staunton
(Roanoke) River (Excerpt)**

STORET Station 4AGSF002.16
South Fork Goose Creek (State Road 607 Bridge)

Collection Date Time	Temp Celsius	Field pH (S.U.)	BOD ₅ (mg/L)	Ammonia (mg/L as N)	Nitrate, Total (mg/L as N)	Hardness (mg/L as CaCO ₃)	Fecal Coliform (MFM- FCBR/100 ml)
1/31/1984 9:15	2.5	7.8	2	<0.1			
2/16/1984 9:30	7	7.4	2	0.2	0.38		
3/5/1984 9:00	5.2	7.4	1	<0.1	0.07		
4/12/1984 8:45	8.8	7	1	<0.1	0.6		
5/16/1984 9:30	11	7.4	1	<0.1	0.4		
6/14/1984 9:40	19.3	7.1	2	<0.1			
7/23/1984 8:45	18	6.9	2	<0.1	0.4		
8/13/1984 9:00	19	6.6	1	<0.1	<0.4		
9/4/1984 9:30	18	7.5	1	<0.1	0.6		
10/31/1984 10:10	14.7	7.4	1	<0.1	0.42		
1/16/1985 9:30	1	6.7	2	<0.1	0.6		<100
2/14/1985 10:00	0	7.3	1	<0.1	0.48		<100
1/7/1985 0:00	10.8	7.9	1	<0.1	0.22		<100
4/8/1985 8:35	6	7.9	2	<0.1	0.29		100
5/13/1985 8:20	14.8	7.5	1	<0.1	0.28		800
6/17/1985 13:30	20	7.9	<1	<0.1	0.32		300
7/11/1985 8:30	17	7.2	1	<0.1	0.31		300
8/5/1985 14:45	20	8.2	<1				200
9/12/1985 9:00	16.1	7.2	<1				<100
10/15/1985 13:30	19.3	8.1	1	<0.1	0.19		<100
11/19/1985 10:00	14	7.15	1	<0.1	0.49		100
12/11/1985 8:30	5.5	7.5	2	<0.1	0.4		100
1/13/1986 8:15	2.7	7.7	1	<0.1	0.49		300
2/5/1986 9:15		7.8	1	<0.1	0.33		100 **
3/5/1986 9:30	3.8	7.6	1	<0.1	0.51		<100 **
4/3/1986 8:45	11.3	7.6	1	<0.1	0.25		200 **
5/15/1986 9:10	13	7.6	1	<0.1	0.3	146	300 **
6/16/1986 9:00	18.5	7.8	<1	<0.1	0.25	147	1100 **
7/2/1986 14:30	20.8	8.1	1	<0.1	0.38	154	1300 **
8/4/1986 13:20	23	8.2	1	<0.1	0.29	170	<100 **
9/2/1986 15:50	16.2	7.6	1	<0.1	0.55	180	100 **
10/14/1986 9:25	15.8	7.2	3	<0.1	0.34	134	900 **
11/13/1986 12:45	8.8	7.9	<1	<0.1	0.45	162	200 **
12/10/1986 9:30	9.7	7.2	1	<0.1	1.48	185	300 **
1/15/1987 8:20	6.5	7.5	<1	<0.1	1	162	100 *
2/5/1987 8:30	3.2	6.9	1	<0.1	0.5	112	100 **
3/10/1987 10:00	5	7	1	0.1	0.54	112	<100 **
4/8/1987 9:30	8.1	7.3	1	<0.1	0.34	108	<100 **
5/5/1987 9:00	11.5	7.73	2	<0.1	0.88	137	100 **
6/2/1987 9:30	19.5	7.78	1	<0.1	0.29	98	
7/20/1987 9:00	19.3	7.9	<1	<0.1	0.26	134	<100 **
8/3/1987 8:50	20.5	7.8	2	<0.1	0.17	150	800 **
9/1/1987 10:05	18.4	7.8	1	<0.1	0.23	172	100 *
10/1/1987 10:00	13.8	7.6	1	0.1	0.29	158	100 **

STORET Station 4AGSF002.16
South Fork Goose Creek (State Road 607 Bridge)

Collection Date Time	Temp Celsius	Field pH (S.U.)	BOD ₅ (mg/L)	Ammonia (mg/L as N)	Nitrate, Total (mg/L as N)	Hardness (mg/L as CaCO ₃)	Fecal Coliform (MFM- FCBR/100 ml)	
11/4/1987 9:30	15.3	8.4	<1	<0.1	0.12	135	100	**
12/2/1987 9:00	6.2	9	<1	<0.1	0.55	132	700	**
1/5/1988 9:30	4.1	8.5	1	<0.1	0.38	156	<100	**
3/2/1988 13:00	7.5	8	1	<0.04	0.79	140	100	**
5/2/1988 8:40	11.9	7.3	1	<0.04	0.25	120	<100	**
6/8/1988 8:45	17.8	8.3	1	0.06	0.96	156	<100	**

All fecal coliform sampling data collected 5 minutes following other STORET data if listed at same time.

90th Percentile Temperature	19.6 °C	Jan-Dec.
90th Percentile Temperature	11.9 °C	Jan.-May (wet season)
90th Percentile pH	8.2 S.U.	
10th Percentile pH	7.0 S.U.	
Mean Hardness	144 mg/L	



2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Fact Sheet prepared for DCR Watershed: L20*

Cause Group Code: **L20R-01-BAC**

Goose Creek

Location: The impairment begins at the confluence of the North and South Forks of Goose Creek extending downstream to the mouth of Bore Auger Creek.

City / County: Bedford Co.

Use(s): Recreation

Cause(s) /

VA Category: Escherichia coli/ 4A

Escherichia coli (E.coli) replaces the 2004 6.78 mile fecal coliform (FC) bacteria 2006 303(d) Listing as the indicator as per Water Quality Standards [9 VAC 25-260-170. Bacteria; other waters]. The Staunton River Bacteria Total Maximum Daily Load (TMDL) is U.S. EPA approved 6/22/2006 [Fed IDs 24386 / 23315 / 23316 / 24387] and SWCB approved 6/17/2007. Goose Creek [Fed ID 24552] and its tributaries are nested within the Staunton River TMDL Watershed. Allocation scenario development is for the entire drainage to provide pollutant reductions for all watersheds contributing to the bacteria impairment. The entirety of the approved TMDL and allocations can be viewed at <http://www.deq.virginia.gov>.

4AGSE037.78- (Rt. 755 Bridge) There are no additional data beyond the 2008 Integrated Report (IR). Both the 2008 and 2010 assessments reveal Escherichia coli (E.coli) samples exceed the 235 cfu/100 ml instantaneous criterion in eight of 12 samples. Exceeding values range from 280 to 930 cfu/100 ml. The 2006 Integrated Report (IR) records E.coli exceedances of the instantaneous criterion in seven of nine samples with the same range of exceedance as in 2008.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-L20R_GSE01A00 / Goose Creek / Goose Creek mainstem from the North and South Fork confluence downstream to the Bore Auger Creek mouth.	4A Escherichia coli	Y	2006	6/22/2006	6.78
Goose Creek			Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
DCR Watershed: L20*					
Escherichia coli - Total Impaired Size by Water Type:					6.78

Sources:

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.

Bacteria TMDLs for the Cub Creek, Turnip Creek, Buffalo Creek, Buffalo Creek (UT), and Staunton River Watersheds, Virginia

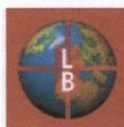
Submitted by

Virginia Department of Environmental Quality

Prepared by



and



THE Louis Berger Group, INC.

2300 N Street, NW
Washington, DC 20037

April 2006

Executive Summary

This report presents the development of Bacteria TMDLs for the Cub Creek, Turnip Creek, Buffalo Creek, an unnamed tributary (UT) of Buffalo Creek, and Staunton River watersheds, located in the Lower Roanoke River Basin in south central Virginia. Segments of Cub Creek, Turnip Creek, and the Staunton River were listed as impaired on Virginia's 1998 303(d) Total Maximum Daily Load Priority List and Report (DEQ, 1998) because of violations of the state's water quality standard for fecal coliform bacteria. These segments as well as a segment of Buffalo Creek (UT) were also included on Virginia's 2002 303(d) Report on Impaired Waters and 2004 305(b)/303(d) Water Quality Assessment Integrated Report. Buffalo Creek was initially placed on the 303(d) list in 2004.

Description of the Study Area

The impaired segment of the Staunton River begins in Campbell County and flows through the borders of Campbell and Pittsylvania Counties into the borders of Halifax and Charlotte Counties. Cub, Turnip, Buffalo, and Buffalo (UT) Creeks are all tributaries to the Staunton River and are located in Charlotte County. All five streams are located in the Lower Roanoke River Basin (USGS Cataloging Unit 03010101 and 03010102). The watershed that encompasses the Cub Creek, Turnip Creek, Buffalo Creek, Buffalo Creek (UT) and Staunton River bacteria impairments is approximately 1,477,287 acres or 2,308 square miles. The watershed drains portions of Bedford, Franklin, Henry, Campbell, Pittsylvania, Appomattox, Charlotte, and Halifax counties.

Approximately 24 percent of the drainage basin is located in the Bedford County. A small portion of the watershed is located in Appomattox and Henry Counties (4.5 and 0.5 percents respectively). The remainder of the watershed is divided among Campbell, Charlotte, Franklin, Pittsylvania, and Halifax Counties (19, 18, 12, 11, and 11 percent, respectively). The watershed makes up 100 percent of the land area in the Bedford City, 89 percent of Charlotte County, 86 percent of Campbell County, 72 percent of Bedford County, 37 percent of Franklin County, 30 percent each of Halifax and Appomattox Counties, 27 percent of Pittsylvania County, and three percent of Henry County.

Interstates 81 and 581 are located to the west of the watershed. US highways 29, 220, and 501 run generally from North to South through the watershed. US highways 460 and 221 run through the North-West section of the watershed.

Bacteria TMDLs have already been approved for six impaired streams in the watershed: Machine Creek, Elk Creek, Sheep Creek, Little Otter River, Big Otter River and Falling River. The first five impairments all flow into Big Otter River, which then flows into the Staunton River, just upstream of the Campbell County/Pittsylvania County line. The last impairment, Falling River, flows to the Staunton River at the border of Campbell, Charlotte, and Halifax Counties. The TMDL developed for this study will include the results of the bacteria TMDLs developed for the Big Otter River and the Falling River watersheds.

Impairment Description

Segments of Cub Creek, Turnip Creek, and the Staunton River were listed as impaired on Virginia's 1998 303(d) Total Maximum Daily Load Priority List and Report (DEQ, 1998) because of violations of the state's water quality standard for fecal coliform bacteria. These segments as well as a segment of Buffalo Creek (UT) were also included on Virginia's 2002 303(d) Report on Impaired Waters and 2004 305(b)/303(d) Water Quality Assessment Integrated Report. Buffalo Creek was initially placed on the 303(d) list in 2004. The impaired segments are located in the Lower Roanoke River Basin in south central Virginia. The watershed is located in the hydrologic units (HUC) 03010101 and 03010102. The impaired watersheds include portions of Campbell, Charlotte, Halifax, Pittsylvania, and Appomattox counties.

The impaired segment of Cub Creek (VAC-L37R-01) extends for 14.21 miles from Big Cub Creek to Terry Creek. Eight out of 21 samples (38%) taken at ACUB010.96 between January 1, 1998 and December 31, 2002 exceeded the fecal coliform bacteria instantaneous criterion of 400 cfu/100mL.

The impaired segment of Turnip Creek (VAC-L36R-01) extends for 2.7 miles from Buck Branch downstream to its mouth at the Staunton River. Eight (8) out of 28 samples

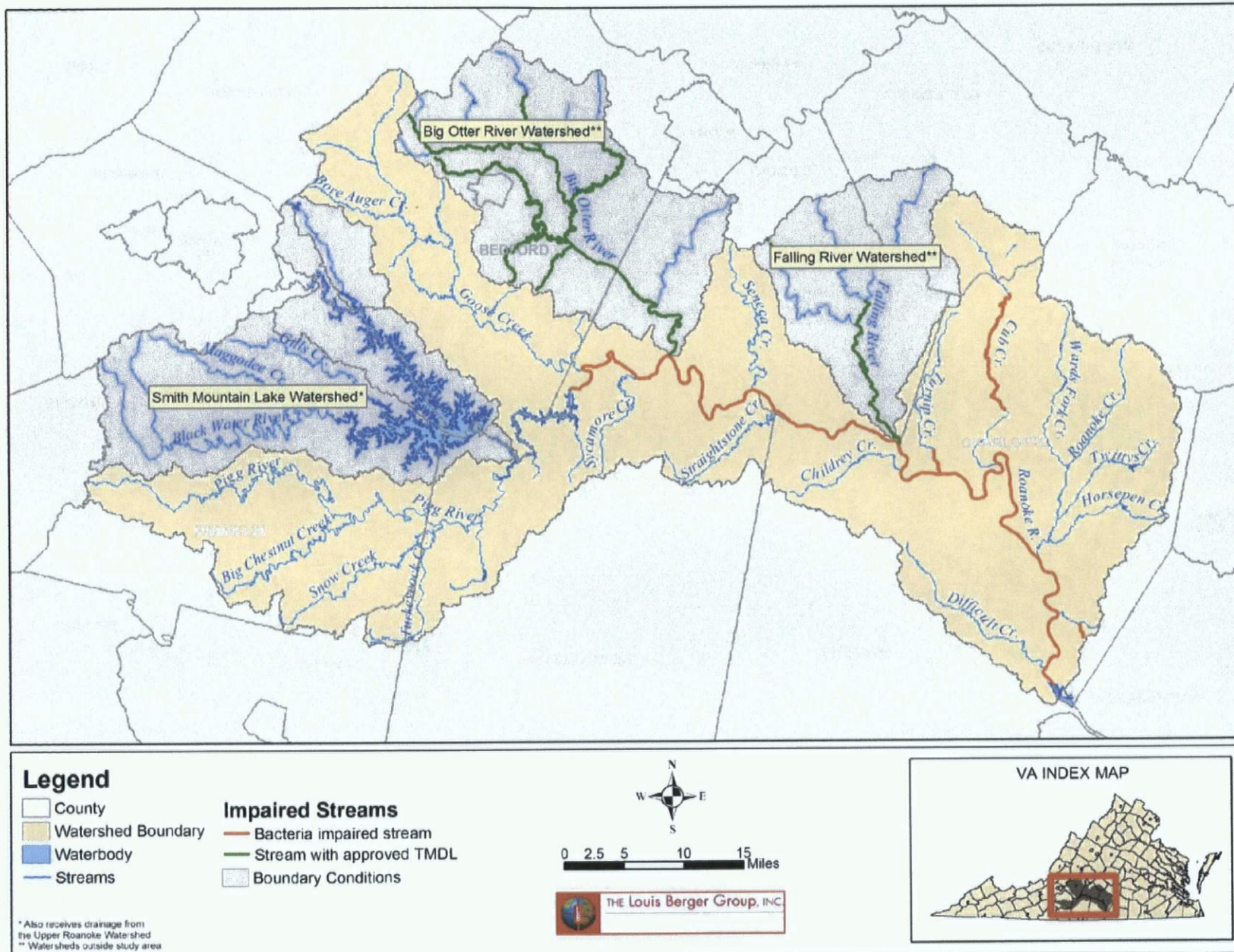


Figure 1-1: Location of the Cub Creek, Turnip Creek, Buffalo Creek, and Buffalo Creek (UT), and Staunton Watersheds and Listed TMDL Segments

5.9 Staunton River TMDL

5.9.1 Staunton River Waste Load Allocation

There are 29 facilities in the Staunton River watershed permitted to discharge bacteria (see Chapter 4). For this TMDL, the wasteload allocation for permitted facilities is to maintain discharge at the design flow limits and bacteria concentrations at their permitted levels of 126 cfu/100mL. Table 5-15 shows the loading from the permitted point source dischargers in the watershed.

Table 5-15: Staunton River Waste load Allocation for *E. coli*

Point Source	Existing Load (cfu/day)	Allocated Load (cfu/day)	Allocated Load (cfu/year)	Percent Reduction
VA0020451	1.72E+10	1.72E+10	6.28E+12	0%
VA0087106	6.99E+09	6.99E+09	2.55E+12	0%
VA0022241	3.72E+08	3.72E+08	1.36E+11	0%
VA0001678	1.56E+10	1.56E+10	5.69E+12	0%
VA0073733	1.67E+08	1.67E+08	6.10E+10	0%
VA0001538	6.32E+09	6.32E+09	2.31E+12	0%
VA0083402	4.16E+08	4.16E+08	1.52E+11	0%
VA0083399	9.16E+08	9.16E+08	3.34E+11	0%
VA0084433	3.82E+08	3.82E+08	1.39E+11	0%
VA0022748	3.43E+07	3.43E+07	1.25E+10	0%
VA0024058	1.19E+09	1.19E+09	4.34E+11	0%
VA0083097	8.28E+09	8.28E+09	3.02E+12	0%
VA0050822	3.85E+08	3.85E+08	1.41E+11	0%
VA0087238	9.54E+07	9.54E+07	3.48E+10	0%
VA0063738	1.22E+08	1.22E+08	4.45E+10	0%
VA0020869	1.67E+07	1.67E+07	6.10E+09	0%
VA0089052	4.77E+02	4.77E+02	1.74E+05	0%
VA0054577	4.77E+02	4.77E+02	1.74E+05	0%
VA0060909	7.15E+07	7.15E+07	2.61E+10	0%
VA0051721	8.11E+07	8.11E+07	2.96E+10	0%
VA0023515	1.00E+08	1.00E+08	3.65E+10	0%
VA0001490	3.10E+08	3.10E+08	1.13E+11	0%
VA0026051	2.71E+09	2.71E+09	9.89E+11	0%
VA0051446	2.23E+09	2.23E+09	8.14E+11	0%
VA0074870	2.29E+07	2.29E+07	8.36E+09	0%
VAG404017	4.77E+06	4.77E+06	1.74E+09	0%
VAG404081	2.15E+06	2.15E+06	7.85E+08	0%
VAG404106	2.15E+06	2.15E+06	7.85E+08	0%
VAG404143	2.86E+06	2.86E+06	1.04E+09	0%
Total	6.40E+10	6.40E+10	2.34E+13	0%

3.5 Fecal Coliform Source Assessment

This section focuses on characterizing the sources that potentially contribute to the fecal coliform loading in the Cub Creek, Turnip Creek, Buffalo Creek, Buffalo Creek (UT), and Staunton River watershed. These sources include permitted facilities, sanitary sewer systems and septic systems, livestock, land application of manure and biosolids, wildlife, and pets. Chapter 4 includes a detailed presentation of how these sources are incorporated and represented in the model.

3.5.1 Permitted Facilities

Data obtained from the DEQ's South Central Regional Office indicate that there are 34 individually permitted facilities located in the Cub Creek, Turnip Creek, Buffalo Creek, Buffalo Creek (UT), and Staunton River watershed, not including the Falling River and Big Otter Watersheds. The permit number, design flow, and status for each permits are presented in **Table 3-12**. The locations of the individual permits are presented in **Figure 3-14** (latitudes and longitudes were not consistently available for the general permits and they could not be mapped). Only municipal facilities are potentially significant sources of fecal coliform, but the flow from all permitted dischargers will be considered in the hydrology calibration.

Table 3-12: Active Permitted Discharges in the Cub Creek, Turnip Creek, Buffalo Creek, Buffalo Creek (UT), and Staunton River Watershed

Permit Number	Facility Name	Facility Type	Design Flow (gpd) ¹	Receiving Waterbody	Status
VA0020451	Altavista Town – Wastewater Treatment Plant	Municipal	3600000	Staunton River	Active
VA0087106	American Electric Power – Leesville Hydro Plant	Industrial	1465000	Staunton River	Active
VA0087238	Bedford County – PSA New Montvale Elementary School	Municipal	20000	Goose Creek, South Fork	Active
VA0063738	Bedford County – Staunton River High School	Municipal	25600	Shoulder Run, UT	Active
VA0020869	Bedford County – Thaxton Elementary School	Municipal	3500	Wolf Creek, UT	Active
VA0089052	Blue Ridge Wood Preserving Inc	Industrial	0	Hunting Creek, UT	Active
VA0054577	BP Products North America Inc	Industrial	0	Goose Creek, South Fork	Active

Bacteria TMDLs for Cub, Turnip, Buffalo, and Buffalo (UT) Creeks, and Staunton River Watersheds

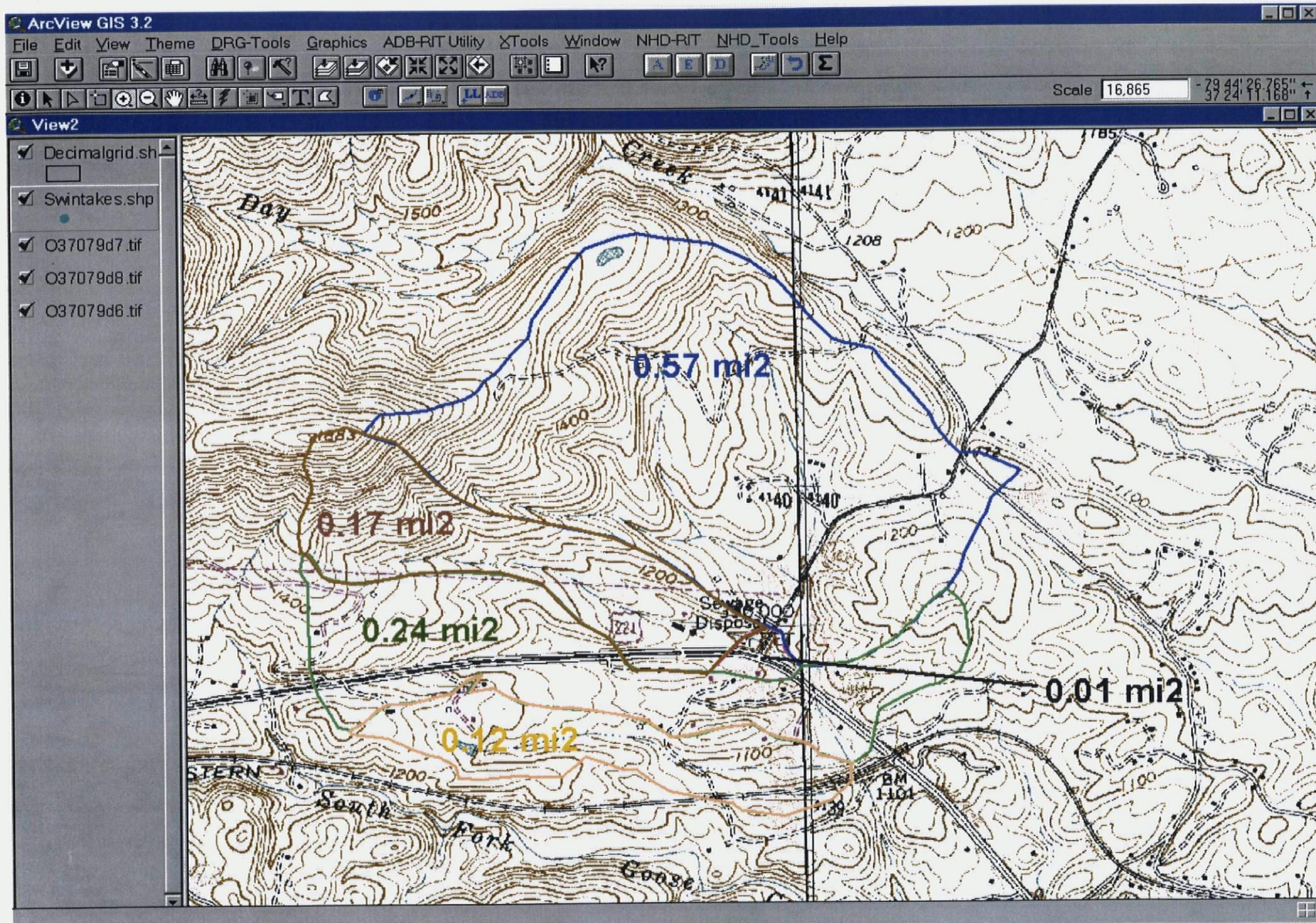
Permit Number	Facility Name	Facility Type	Design Flow (gpd) ¹	Receiving Waterbody	Status
VA0022241	Brookneal Town – Staunton River Lagoon	Municipal	78000	Staunton River	Active
VA0001678	Burlington Industries LCC Hurt Plant	Industrial	3275000	Staunton River	Active
VA0060909	Camp Virginia Jaycees STP	Municipal	15000	Day Creek, UT	Active
VA0029319	Charlotte County School Bacon District Elementary	Municipal	6000	Little Horsepen Creek, UT	Active
VA0063118	Charlotte County School Jeffress Elementary	Municipal	4000	UT Sandy Creek	Active
VA0029335	Charlotte County School Phenix Elementary	Municipal	6000	UT Terrys Creek	Active
VA0073733	Clover WWTP	Municipal	35000	Clover Creek	Active
VA0051721	Colonial Pipeline Co	Industrial	17000	Goose Creek, South Fork	Active
VA0051934	Colonial Pipeline Hancock	Industrial	1500	Turnip Creek/UT	Active
VA0001538	Dan River Inc – Brookneal	Industrial	1326000	Staunton River	Active
VA0083402	Dominion – Altavista PS	Industrial	87200	Staunton River	Active
VA0083399	Dominion – Pittsylvania PS	Industrial	192000	Staunton River	Active
VA0084433	Drakes Branch WWTP	Municipal	80000	Twitty's Creek	Active
VA0022748	Halifax Co School Clays Mill Elementary	Municipal	7200	Mill Branch, UT	Active
VA0024058	Keysville WWTP	Municipal	250000	Ash Camp Creek	Active
VA0023515	Moneta Adult Detention Facility	Municipal	21000	Mattox Creek, UT	Active
VA0001490	Motiva Enterprises LLC – Montvale	Industrial	65000	Goose Creek, South Fork	Active
VA0083097	Old Dominion Electric Coop Clover	Industrial	1735000	Staunton River	Active
VA0026051	Trans Montaigne Terminaling Inc – Atlantic	Industrial	569000	Goose Creek, South Fork	Active
VA0051446	TransMontaigne Terminaling Inc – Piedmont	Industrial	467000	Goose Creek, South Fork, UT	Active
VA0050822	Westpoint Stevens Inc Drakes Branch	Industrial	80700	Twitty's Creek	History
VA0074870	Woodhaven Nursing Home - Montvale	Municipal	4800	Goose Creek, South Fork, UT	Active
VAG404017	Domestic Sewage Discharge	Residence	1000	Hazelnut Branch UT	Active
VAG404021	Domestic Sewage Discharge	Residence	450	Tanyard Branch UT	Active
VAG404081	Domestic Sewage Discharge	Residence	450	Berles Creek UT	Active
VAG404106	Domestic Sewage Discharge	Residence	450	Hazelnut Branch UT	Active
VAG404143	Domestic Sewage Discharge	Residence	600	Horsepen Creek	Active

¹: Gallons per day

Attachment F

Regional Dissolved Oxygen Model (Version 4.10)

- **Map of Model Segments and Drainage Areas**
- **0.0048 MGD Facility**
 - **Regional Model Calculations**
 - **Regional Model Input Summary**
 - **Model Output (BOD₅=30 mg/L, TKN=20 mg/L, DO=0 mg/L)**
- **0.0066 MGD Facility**
 - **Regional Model Calculations**
 - **Regional Model Input Summary**
 - **Model Output (BOD₅=30 mg/L, TKN=20 mg/L, DO=0 mg/L)**
- **0.025 MGD Facility**
 - **Regional Model Calculations**
 - **Regional Model Input Summary**
 - **Model Outputs (BOD₅=30 mg/L, TKN=16.31 mg/L, DO=5.6 mg/L)**
(BOD₅=30 mg/L, TKN=16.31 mg/L, DO=5.5 mg/L)
(BOD₅=25 mg/L, TKN=16.31 mg/L, DO=5.5 mg/L)
(BOD₅=10 mg/L, TKN=16.31 mg/L, DO=5.2 mg/L)



0.0048 MGD Facility

Regional DO Model Calculations

South Fork Goose Creek, UT
Segment 1

Rectangular

Velocity Calculations at 7Q10

Velocity and area calculations to use in table.

7Q10

Effluent Stream

Flow Flow

Manning n	Slope	MGD	MGD
0.05	0.025	0.0048	0.27

Stream characteristics at 7Q10 conditions calculated in table.

Depth (ft)	Width (ft)	Velocity (ft/s)
0.14	2.644	1.174

Manning Equation

$$V(\text{fps}) = (1.486/n) * R_h^{(2/3)} * S^{.5}$$

Rectangular

$$R_h = d * w / (2d + w)$$

Rectangular Surface Area = d*w

Continuity Equation

$$V = Q/A$$

Roughness Coefficient		
Factors	n	+
sand bottom	0.05	
silt bottom	0.07	
gravel bottom	0.09	
small rock	0.11	
large rock	0.15	
boulders	0.18	
modest meander		n+0.02
severe meander	0.00	n+0.04
light plants		n+0.03
heavy plants		n+0.06

Site Visit Stream Characteristics:

Length of Segment (feet)	794
Length of Segment (mi)	0.150
Observed Width	4
Observed Depth	0.2

Depth (ft)	Width (ft)	R _h (ft)	Manning V (ft/s)	Continuity V (ft/s)	X-sec area (ft ²)	Flow (cfs)*
0.157	2.664	0.140	1.274	1.017	0.4182	0.4253
0.147	2.654	0.132	1.225	1.090	0.3901	0.4253
0.137	2.644	0.124	1.174	1.174	0.3622	0.4253
0.127	2.634	0.116	1.121	1.271	0.3345	0.4253
0.117	2.624	0.107	1.066	1.385	0.3070	0.4253
0.107	2.614	0.099	1.009	1.520	0.2797	0.4253
0.097	2.604	0.090	0.949	1.684	0.2526	0.4253
0.087	2.594	0.082	0.887	1.884	0.2257	0.4253
0.077	2.584	0.073	0.821	2.137	0.1990	0.4253
0.067	2.574	0.064	0.752	2.466	0.1725	0.4253
0.057	2.564	0.055	0.679	2.910	0.1461	0.4253
0.047	2.554	0.045	0.600	3.543	0.1200	0.4253
0.037	2.544	0.036	0.514	4.518	0.0941	0.4253
0.027	2.534	0.026	0.419	6.216	0.0684	0.4253
0.017	2.524	0.017	0.309	9.911	0.0429	0.4253
0.007	2.514	0.007	0.172	24.165	0.0176	0.4253
-0.003	2.504	-0.003	#NUM!	-56.610	-0.0075	0.4253
-0.013	2.494	-0.013	#NUM!	-13.116	-0.0324	0.4253
-0.023	2.484	-0.023	#NUM!	-7.443	-0.0571	0.4253
-0.033	2.474	-0.034	#NUM!	-5.209	-0.0816	0.4253

*Includes discharge

Bold font indicates resolved velocities.

Information for Model

Elevation Beginning (feet)	1100
Elevation Ending (feet)	1080
Drainage Area at Beginning (sq mi.)	0.17
Drainage Area at End (sq mi.)	0.18

Regional DO Model Calculations

South Fork Goose Creek, UT
Segment 2

Rectangular

Velocity Calculations at 7Q10

Velocity and area calculations to use in table.

7Q10
Stream
Flow +

Manning n	Slope (ft/ft)	Effluent Flow MGD	trib MGD
0.05	0.018	0.0048	0.3017

Stream characteristics at 7Q10 conditions calculated in table.

Depth (ft)	Width (ft)	Velocity (ft/s)
0.165	2.678	1.095

Manning Equation

$$V(\text{fps}) = (1.486/n) * R_h^{2/3} * S^{0.5}$$

Rectangular

$$R_h = (d * w) / (w + 2d)$$

Rectangular Surface Area = d * w

Continuity Equation

$$V = Q/A$$

Roughness Coefficient		
Factors	n	+
sand bottom	0.05	
silt bottom	0.07	
gravel bottom	0.09	
small rock bot	0.11	
large rock bott	0.15	
boulder botton	0.18	
modest meander		n+0.02
severe meander		n+0.04
light plants		n+0.03
heavy plants		n+0.06

Site Visit Stream Characteristics:

Length of Segment (feet)	1142
Length of Segment (mi)	0.216
Observed Width	2
Observed Depth	0.2

Depth (ft)	Width (ft)	R _h (ft)	Manning V (ft/s)	Continuity V (ft/s)	X-sec area (ft ²)	Flow (cfs)*
0.183	2.787	0.162	1.168	0.930	0.5100	0.4743
0.173	2.687	0.153	1.126	1.020	0.4649	0.4743
0.163	2.677	0.145	1.087	1.087	0.4364	0.4743
0.153	2.667	0.137	1.047	1.162	0.4081	0.4743
0.143	2.657	0.129	1.005	1.248	0.3800	0.4743
0.133	2.647	0.121	0.961	1.347	0.3521	0.4743
0.123	2.637	0.113	0.917	1.462	0.3244	0.4743
0.113	2.627	0.104	0.870	1.598	0.2969	0.4743
0.103	2.617	0.095	0.822	1.759	0.2696	0.4743
0.093	2.607	0.087	0.771	1.956	0.2425	0.4743
0.083	2.597	0.078	0.718	2.200	0.2156	0.4743
0.073	2.587	0.069	0.662	2.511	0.1889	0.4743
0.063	2.577	0.060	0.603	2.921	0.1624	0.4743
0.053	2.567	0.051	0.540	3.486	0.1361	0.4743
0.043	2.557	0.042	0.472	4.313	0.1100	0.4743
0.033	2.547	0.032	0.398	5.643	0.0841	0.4743
0.023	2.537	0.023	0.314	8.128	0.0584	0.4743
0.013	2.527	0.013	0.216	14.437	0.0329	0.4743
0.003	2.517	0.003	0.082	62.808	0.0076	0.4743
-0.007	2.507	-0.007	#NUM!	-27.025	-0.0175	0.4743

*Includes discharge

Bold font indicates resolved velocities.

Information for Model

Elevation Beginning (feet)	1080
Elevation Ending (feet)	1060
Drainage Area at Beginning (sq mi.)	0.18
Drainage Area at End (sq mi.)	0.42
Drainage to Flow Conversion *	0.0317
Drainage Area for Tributary (mi ²)	0.57

*conversion = (MGD/drainage area)0.65 MGD/11.7 m²
(from flow frequency memo)

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.**

File Information

File Name: C:\Documents and Settings\pmp94864\My Documents\Working files\BECK
Date Modified: January 22, 2013

Water Quality Standards Information

Stream Name: SOUTH FORK GOOSE CREEK, UT
River Basin: Roanoke River Basin
Section: 5a
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: PWS

Background Flow Information

Gauge Used: Tinker Creek near Daleville
Gauge Drainage Area: 11.7 Sq.Mi.
Gauge 7Q10 Flow: 0.65 MGD
Headwater Drainage Area: 0 Sq.Mi.
Headwater 7Q10 Flow: 0.27 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 5.555556E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 19.6 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.931448 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 1100 ft above MSL
Model End Elevation: 1060 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	WOODHAVEN NURSING HOME STP
VPDES Permit No.:	VA0074870

Discharger Flow Information

Flow:	0.0048 MGD
cBOD5:	30 mg/l
TKN:	20 mg/l
D.O.:	0 mg/l
Temperature:	12.2 Degrees C

Geographic Information

Segment Length:	0.15 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	0.18 Sq.Mi.
Upstream Elevation:	1100 Ft.
Downstream Elevation:	1080 Ft.

Hydraulic Information

Segment Width:	2.644 Ft.
Segment Depth:	0.137 Ft.
Segment Velocity:	1.174 Ft./Sec.
Segment Flow:	0.275 MGD
Incremental Flow:	0.01 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

Segment Information for Segment 2

Definition Information

Segment Definition: A tributary enters.
Tributary Name: UNNAMED TRIBUTARY

Tributary Flow Information

Flow: 0.0317 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 7.94 mg/l
Temperature: 19.6 Degrees C

Geographic Information

Segment Length: 0.216 miles
Upstream Drainage Area: 0.18 Sq.Mi.
Downstream Drainage Area: 0.42 Sq.Mi.
Upstream Elevation: 1080 Ft.
Downstream Elevation: 1060 Ft.

Hydraulic Information

Segment Width: 2.676 Ft.
Segment Depth: 0.163 Ft.
Segment Velocity: 1.087 Ft./Sec.
Segment Flow: 0.307 MGD
Incremental Flow: 0.013 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

modout.txt

"Model Run For C:\Documents and Settings\pmp94864\My Documents\Working
files\BECKY\PERMITS\VPDES\woodhaven\Reissuance 2013\Data\woodhaven 4800 model data
eval 2013 final.mod On 1/22/2013 10:03:35 AM"

"Model is for SOUTH FORK GOOSE CREEK, UT."

"Model starts at the WOODHAVEN NURSING HOME STP discharge."

"Background Data"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.27,	2,	0,	7.931,	19.6

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0048,	30,	20,	0,	12.2

 ✓

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.15,	2.644,	.137,	1.174

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.2748,	7.793,	6.223,	1.286,	8.838,	19.47074

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.5,	1.464,	20,	19.751,	.55,	.528,	0,	0

"Output for Segment 1"

"Segment starts at WOODHAVEN NURSING HOME STP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	7.793,	6.223,	1.286		
.1,	.1,	7.847,	6.176,	1.282		
.15,	.15,	7.872,	6.153,	1.28		

"Discharge/Tributary Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0317,	2,	0,	7.94,	19.6

"Incremental Flow Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.01,	2,	0,	7.957,	19.6

"Hydraulic Information for Segment 2"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.216,	2.676,	.163,	1.087

"Initial Mix Values for Segment 2"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.3165,	7.881,	6.001,	1.111,	8.841,	19.48777

modout.txt
 "Rate Constants for Segment 2. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1.5, 1.465, 20, 19.759, .55, .529, 0, 0

"Output for Segment 2"
 "Segment starts at UNNAMED TRIBUTARY"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 .15, 0, 7.881, 6.001, 1.111
 .25, .1, 7.932, 5.952, 1.108
 .35, .2, 7.957, 5.903, 1.105
 .366, .216, 7.957, 5.895, 1.104

"END OF FILE"

0.0066 MGD Facility

Regional DO Model Calculations

South Fork Goose Creek, UT
Segment 1

Rectangular

Velocity Calculations at 7Q10

Velocity and area calculations to use in table.

7Q10

Effluent Stream

Flow Flow

Manning n	Slope	Flow MGD	Flow MGD
0.05	0.025	0.0066	0.27

Stream characteristics at 7Q10 conditions calculated in table.

Depth (ft)	Width (ft)	Velocity (ft/s)
0.137	2.661	1.174

Manning Equation

$$V(\text{fps}) = (1.486/n) * R_h^{(2/3)} * S^{.5}$$

Rectangular

$$R_h = d * w / (2d + w)$$

Rectangular Surface Area = d*w

Continuity Equation

$$V = Q/A$$

Roughness Coefficient		
Factors	n	+
sand bottom	0.05	
silt bottom	0.07	
gravel bottom	0.09	
small rock	0.11	
large rock	0.15	
boulders	0.18	
modest meander		n+0.02
severe meander	0.00	n+0.04
light plants		n+0.03
heavy plants		n+0.06

Site Visit Stream Characteristics:

Length of Segment (feet)	794
Length of Segment (mi)	0.150
Observed Width	4
Observed Depth	0.2

Depth (ft)	Width (ft)	R _h (ft)	Manning V (ft/s)	Continuity V (ft/s)	X-sec area (ft ²)	Flow (cfs)*
0.157	2.681	0.141	1.275	1.017	0.4209	0.4280
0.147	2.671	0.132	1.225	1.090	0.3926	0.4280
0.137	2.661	0.124	1.174	1.174	0.3646	0.4280
0.127	2.651	0.116	1.121	1.271	0.3367	0.4280
0.117	2.641	0.107	1.066	1.385	0.3090	0.4280
0.107	2.631	0.099	1.009	1.520	0.2815	0.4280
0.097	2.621	0.090	0.949	1.684	0.2542	0.4280
0.087	2.611	0.082	0.887	1.884	0.2272	0.4280
0.077	2.601	0.073	0.822	2.137	0.2003	0.4280
0.067	2.591	0.064	0.752	2.466	0.1736	0.4280
0.057	2.581	0.055	0.679	2.910	0.1471	0.4280
0.047	2.571	0.045	0.600	3.542	0.1208	0.4280
0.037	2.561	0.036	0.514	4.517	0.0948	0.4280
0.027	2.551	0.026	0.419	6.215	0.0689	0.4280
0.017	2.541	0.017	0.309	9.909	0.0432	0.4280
0.007	2.531	0.007	0.172	24.160	0.0177	0.4280
-0.003	2.521	-0.003	#NUM!	-56.597	-0.0076	0.4280
-0.013	2.511	-0.013	#NUM!	-13.113	-0.0326	0.4280
-0.023	2.501	-0.023	#NUM!	-7.441	-0.0575	0.4280
-0.033	2.491	-0.034	#NUM!	-5.207	-0.0822	0.4280

*Includes discharge

Bold font indicates resolved velocities.

Information for Model

Elevation Beginning (feet)	1100
Elevation Ending (feet)	1080
Drainage Area at Beginning (sq mi.)	0.17
Drainage Area at End (sq mi.)	0.18

Regional DO Model Calculations

South Fork Goose Creek, UT
Segment 2

Rectangular

Velocity Calculations at 7Q10

Velocity and area calculations to use in table.

7Q10
Stream
Flow +

Manning n	Slope (ft/ft)	Effluent Flow MGD	trib MGD
0.05	0.018	0.0066	0.3017

Stream characteristics at 7Q10 conditions calculated in table.

Depth (ft)	Width (ft)	Velocity (ft/s)
0.158	2.82	1.071

Manning Equation

$$V(\text{fps}) = (1.486/n) * R_h^{(2/3)} * S^{.5}$$

Rectangular

$$R_h = (d * w) / (w + 2d)$$

Rectangular Surface Area = d * w

Continuity Equation

$$V = Q/A$$

Roughness Coefficient		
Factors	n	+
sand bottom	0.05	
silt bottom	0.07	
gravel bottom	0.09	
small rock bot	0.11	
large rock bott	0.15	
boulder bottom	0.18	
modest meander	n+0.02	
severe meander	n+0.04	
light plants	n+0.03	
heavy plants	n+0.06	

Site Visit Stream Characteristics:	
Length of Segment (feet)	1142
Length of Segment (mi)	0.216
Observed Width	2
Observed Depth	0.2

Depth (ft)	Width (ft)	R _h (ft)	Manning V (ft/s)	Continuity V (ft/s)	X-sec area (ft ²)	Flow (cfs)*
0.188	2.94	0.167	1.191	0.863	0.5527	0.4770
0.178	2.84	0.158	1.150	0.944	0.5055	0.4770
0.168	2.83	0.150	1.111	1.003	0.4754	0.4770
0.158	2.82	0.142	1.071	1.071	0.4456	0.4770
0.148	2.81	0.134	1.029	1.147	0.4159	0.4770
0.138	2.8	0.126	0.987	1.235	0.3864	0.4770
0.128	2.79	0.117	0.942	1.336	0.3571	0.4770
0.118	2.78	0.109	0.896	1.454	0.3280	0.4770
0.108	2.77	0.100	0.848	1.595	0.2992	0.4770
0.098	2.76	0.092	0.799	1.764	0.2705	0.4770
0.088	2.75	0.083	0.747	1.971	0.2420	0.4770
0.078	2.74	0.074	0.692	2.232	0.2137	0.4770
0.068	2.73	0.065	0.634	2.570	0.1856	0.4770
0.058	2.72	0.056	0.573	3.024	0.1578	0.4770
0.048	2.71	0.046	0.508	3.667	0.1301	0.4770
0.038	2.7	0.037	0.436	4.650	0.1026	0.4770
0.028	2.69	0.027	0.358	6.334	0.0753	0.4770
0.018	2.68	0.018	0.268	9.889	0.0482	0.4770
0.008	2.67	0.008	0.157	22.334	0.0214	0.4770
-0.002	2.66	-0.002	#NUM!	-89.670	-0.0053	0.4770

*Includes discharge

Bold font indicates resolved velocities.

Information for Model	
Elevation Beginning (feet)	1080
Elevation Ending (feet)	1060
Drainage Area at Beginning (sq mi.)	0.18
Drainage Area at End (sq mi.)	0.42
Drainage to Flow Conversion *	0.0317
Drainage Area for Tributary (mi ²)	0.57

*conversion = (MGD/drainage area)0.65 MGD/11.7 m²
(from flow frequency memo)

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

File Information

File Name: C:\Documents and Settings\pmp94864\My Documents\Working files\BECK
Date Modified: January 22, 2013

Water Quality Standards Information

Stream Name: SOUTH FORK GOOSE CREEK, UT
River Basin: Roanoke River Basin
Section: 5a
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: PWS

Background Flow Information

Gauge Used: Tinker Creek near Daleville
Gauge Drainage Area: 11.7 Sq.Mi.
Gauge 7Q10 Flow: 0.65 MGD
Headwater Drainage Area: 0 Sq.Mi.
Headwater 7Q10 Flow: 0.27 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 5.555556E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 19.6 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.931448 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 1100 ft above MSL
Model End Elevation: 1060 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	WOODHAVEN NURSING HOME STP
VPDES Permit No.:	VA0074870

Discharger Flow Information

Flow:	0.0066 MGD
cBOD5:	30 mg/l
TKN:	20 mg/l
D.O.:	0 mg/l
Temperature:	12.2 Degrees C

Geographic Information

Segment Length:	0.15 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	0.18 Sq.Mi.
Upstream Elevation:	1100 Ft.
Downstream Elevation:	1080 Ft.

Hydraulic Information

Segment Width:	2.661 Ft.
Segment Depth:	0.137 Ft.
Segment Velocity:	1.174 Ft./Sec.
Segment Flow:	0.277 MGD
Incremental Flow:	0.01 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

Segment Information for Segment 2

Definition Information

Segment Definition: A tributary enters.
Tributary Name: UNNAMED TRIBUTARY

Tributary Flow Information

Flow: 0.0317 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 7.94 mg/l
Temperature: 19.6 Degrees C

Geographic Information

Segment Length: 0.216 miles
Upstream Drainage Area: 0.18 Sq.Mi.
Downstream Drainage Area: 0.42 Sq.Mi.
Upstream Elevation: 1080 Ft.
Downstream Elevation: 1060 Ft.

Hydraulic Information

Segment Width: 2.82 Ft.
Segment Depth: 0.158 Ft.
Segment Velocity: 1.071 Ft./Sec.
Segment Flow: 0.308 MGD
Incremental Flow: 0.013 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

modout.txt

"Model Run For C:\Documents and Settings\pmp94864\My Documents\Working
files\BECKY\PERMITS\VPDES\Woodhaven\Reissuance 2013\Data\woodhaven 6600 model data
eval 2013 final 2.mod On 1/22/2013 10:17:51 AM"

"Model is for SOUTH FORK GOOSE CREEK, UT."
"Model starts at the WOODHAVEN NURSING HOME STP discharge."

"Background Data"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.27,	2,	0,	7.931,	19.6

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0066,	30,	20,	0,	12.2

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.15,	2.661,	.137,	1.174

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.2766,	7.742,	6.67,	1.756,	8.846,	19.42343

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.5,	1.461,	20,	19.728,	.55,	.526,	0,	0

"Output for Segment 1"

"Segment starts at WOODHAVEN NURSING HOME STP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	0,	0,	7.742,	6.67,	1.756
.1,	.1,	.1,	.1,	7.797,	6.619,	1.751
.15,	.15,	.15,	.15,	7.823,	6.594,	1.749

"Discharge/Tributary Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0317,	2,	0,	7.94,	19.6

"Incremental Flow Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.01,	2,	0,	7.963,	19.6

"Hydraulic Information for Segment 2"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.216,	2.82,	.158,	1.071

"Initial Mix Values for Segment 2"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.3183,	7.839,	6.385,	1.52,	8.848,	19.44656

modout.txt
 "Rate Constants for Segment 2. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1.5, 1.462, 20, 19.739, .55, .527, 0, 0

"Output for Segment 2"
 "Segment starts at UNNAMED TRIBUTARY"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 .15, 0, 7.839, 6.385, 1.52
 .25, .1, 7.892, 6.332, 1.515
 .35, .2, 7.94, 6.279, 1.51
 .366, .216, 7.947, 6.271, 1.509

"END OF FILE"

0.025 MGD Facility

Regional DO Model Calculations

South Fork Goose Creek, UT
Segment 1

Rectangular

Velocity Calculations at 7Q10

Velocity and area calculations to use in table.

7Q10

Effluent Stream

Flow Flow

Manning n	Slope	MGD	MGD
0.05	0.025	0.025	0.27

Stream characteristics at 7Q10 conditions calculated in table.		
Depth (ft)	Width (ft)	Velocity (ft/s)
0.1400	2.736	1.192

Manning Equation

$$V(\text{fps}) = (1.486/n) * R_h^{2/3} * S^{.5}$$

Rectangular

$$R_h = d * w / (2d + w)$$

Rectangular Surface Area = d*w

Continuity Equation

$$V = Q/A$$

Roughness Coefficient		
Factors	n	+
sand bottom	0.05	
silt bottom	0.07	
gravel bottom	0.09	
small rock	0.11	
large rock	0.15	
boulders	0.18	
modest meander		n+0.02
severe meander	0.00	n+0.04
light plants		n+0.03
heavy plants		n+0.06

Site Visit Stream Characteristics:	
Length of Segment (feet)	794
Length of Segment (mi)	0.150
Observed Width	4
Observed Depth	0.2

Depth (ft)	Width (ft)	R _h (ft)	Manning V (ft/s)	Continuity V (ft/s)	X-sec area (ft ²)	Flow (cfs)*
0.19	2.786	0.167	1.432	0.862	0.5293	0.4565
0.18	2.776	0.159	1.386	0.914	0.4997	0.4565
0.17	2.766	0.151	1.340	0.971	0.4702	0.4565
0.16	2.756	0.143	1.292	1.035	0.4410	0.4565
0.15	2.746	0.135	1.243	1.108	0.4119	0.4565
0.14	2.736	0.127	1.192	1.192	0.3830	0.4565
0.13	2.726	0.119	1.139	1.288	0.3544	0.4565
0.12	2.716	0.110	1.085	1.401	0.3259	0.4565
0.11	2.706	0.102	1.028	1.534	0.2977	0.4565
0.100	2.696	0.093	0.969	1.693	0.2696	0.4565
0.09	2.686	0.084	0.907	1.888	0.2417	0.4565
0.08	2.676	0.075	0.842	2.132	0.2141	0.4565
0.07	2.666	0.067	0.774	2.446	0.1866	0.4565
0.06	2.656	0.057	0.702	2.865	0.1594	0.4565
0.05	2.646	0.048	0.625	3.451	0.1323	0.4565
0.04	2.636	0.039	0.541	4.330	0.1054	0.4565
0.03	2.626	0.029	0.449	5.795	0.0788	0.4565
0.02	2.616	0.020	0.344	8.725	0.0523	0.4565
0.01	2.606	0.010	0.218	17.518	0.0261	0.4565
-3.12E-17	2.596	0.000	#NUM!	#####	0.0000	0.4565

*Includes discharge

Bold font indicates resolved velocities.

Information for Model	
Elevation Beginning (feet)	1100
Elevation Ending (feet)	1080
Drainage Area at Beginning (sq mi.)	0.17
Drainage Area at End (sq mi.)	0.18

Regional DO Model Calculations

South Fork Goose Creek, UT
Segment 2

Rectangular

Velocity Calculations at 7Q10

Velocity and area calculations to use in table.

7Q10

Stream

Flow +

trib

Manning n	Slope (ft/ft)	Effluent Flow MGD	trib MGD
0.05	0.018	0.025	0.3017

Stream characteristics at 7Q10 conditions calculated in table.

Depth (ft)	Width (ft)	Velocity (ft/s)
0.160	2.92	1.082

Manning Equation

$$V(\text{fps}) = (1.486/n) \cdot R_h^{2/3} \cdot S^{1/2}$$

Rectangular

$$R_h = (d \cdot w) / (w + 2d)$$

Rectangular Surface Area = $d \cdot w$

Continuity Equation

$$V = Q/A$$

Roughness Coefficient		
Factors	n	+
sand bottom	0.05	
silt bottom	0.07	
gravel bottom	0.09	
small rock bot	0.11	
large rock bot	0.15	
boulder bottom	0.18	
modest meander		n+0.02
severe meander		n+0.04
light plants		n+0.03
heavy plants		n+0.06

Site Visit Stream Characteristics:

Length of Segment (feet)	1142
Length of Segment (mi)	0.216
Observed Width	2
Observed Depth	0.2

Depth (ft)	Width (ft)	R_h (ft)	Manning V (ft/s)	Continuity V (ft/s)	X-sec area (ft ²)	Flow (cfs)*
0.210	3.06	0.185	1.275	0.787	0.6426	0.5055
0.200	2.96	0.176	1.236	0.854	0.5920	0.5055
0.190	2.95	0.168	1.199	0.902	0.5605	0.5055
0.180	2.94	0.160	1.161	0.955	0.5292	0.5055
0.170	2.93	0.152	1.122	1.015	0.4981	0.5055
0.160	2.92	0.144	1.082	1.082	0.4672	0.5055
0.150	2.91	0.136	1.040	1.158	0.4365	0.5055
0.140	2.9	0.128	0.997	1.245	0.4060	0.5055
0.130	2.89	0.119	0.953	1.346	0.3757	0.5055
0.120	2.88	0.111	0.907	1.463	0.3456	0.5055
0.110	2.87	0.102	0.860	1.601	0.3157	0.5055
0.100	2.86	0.093	0.810	1.768	0.2860	0.5055
0.090	2.85	0.085	0.758	1.971	0.2565	0.5055
0.080	2.84	0.076	0.704	2.225	0.2272	0.5055
0.070	2.83	0.067	0.647	2.552	0.1981	0.5055
0.060	2.82	0.058	0.586	2.988	0.1692	0.5055
0.050	2.81	0.048	0.521	3.598	0.1405	0.5055
0.040	2.8	0.039	0.451	4.514	0.1120	0.5055
0.030	2.79	0.029	0.374	6.040	0.0837	0.5055
0.020	2.78	0.020	0.287	9.092	0.0556	0.5055

*Includes discharge

Bold font indicates resolved velocities.

Information for Model	
Elevation Beginning (feet)	1080
Elevation Ending (feet)	1060
Drainage Area at Beginning (sq mi.)	0.18
Drainage Area at End (sq mi.)	0.42
Drainage to Flow Conversion *	0.0317
Drainage Area for Tributary (mi ²)	0.57

*conversion = (MGD/drainage area)0.65 MGD/11.7 m²
(from flow frequency memo)

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

File Information

File Name: C:\Documents and Settings\pmp94864\My Documents\Working files\BECK
Date Modified: January 22, 2013

Water Quality Standards Information

Stream Name: SOUTH FORK GOOSE CREEK, UT
River Basin: Roanoke River Basin
Section: 5a
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: PWS

Background Flow Information

Gauge Used: Tinker Creek near Daleville
Gauge Drainage Area: 11.7 Sq.Mi.
Gauge 7Q10 Flow: 0.65 MGD
Headwater Drainage Area: 0 Sq.Mi.
Headwater 7Q10 Flow: 0.27 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 5.555556E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 19.6 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.931448 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 1100 ft above MSL
Model End Elevation: 1060 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	WOODHAVEN NURSING HOME STP
VPDES Permit No.:	VA0074870

Discharger Flow Information

Flow:	0.025 MGD
cBOD5:	30 mg/l
TKN:	16.31 mg/l
D.O.:	5.6 mg/l
Temperature:	12.2 Degrees C

Geographic Information

Segment Length:	0.15 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	0.18 Sq.Mi.
Upstream Elevation:	1100 Ft.
Downstream Elevation:	1080 Ft.

Hydraulic Information

Segment Width:	2.736 Ft.
Segment Depth:	0.14 Ft.
Segment Velocity:	1.192 Ft./Sec.
Segment Flow:	0.295 MGD
Incremental Flow:	0.01 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Sand
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH FORK GOOSE CREEK, UT.

Segment Information for Segment 2

Definition Information

Segment Definition: A tributary enters.
Tributary Name: UNNAMED TRIBUTARY

Tributary Flow Information

Flow: 0.0317 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 7.94 mg/l
Temperature: 19.6 Degrees C

Geographic Information

Segment Length: 0.216 miles
Upstream Drainage Area: 0.18 Sq.Mi.
Downstream Drainage Area: 0.42 Sq.Mi.
Upstream Elevation: 1080 Ft.
Downstream Elevation: 1060 Ft.

Hydraulic Information

Segment Width: 2.92 Ft.
Segment Depth: 0.16 Ft.
Segment Velocity: 1.082 Ft./Sec.
Segment Flow: 0.327 MGD
Incremental Flow: 0.013 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

modout.txt

"Model Run For C:\Documents and Settings\pmp94864\My Documents\Working files\BECKY\PERMITS\VPDES\woodhaven\Reissuance 2013\woodhaven 25000 model data eval 2013 new mod final 2 new temp.mod On 1/22/2013 10:20:16 AM"

"Model is for SOUTH FORK GOOSE CREEK, UT."

"Model starts at the WOODHAVEN NURSING HOME STP discharge."

"Background Data"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.27,	2,	0,	7.931,	19.6

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.025,	30,	16.31,	5.6,	12.2

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.15,	2.736,	.14,	1.192

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.295,	7.734,	10.932,	4.884,	8.923,	18.97288

7.931 - 7.734 = 0.197 mg/L

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.7,	1.622,	20,	19.519,	.55,	.508,	0,	0

"Output for Segment 1"

"Segment starts at WOODHAVEN NURSING HOME STP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	7.734,	10.932,	4.884		
.1,	.1,	7.749,	10.841,	4.871		
.15,	.15,	7.756,	10.796,	4.865		

"Discharge/Tributary Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0317,	2,	0,	7.94,	19.6

"Incremental Flow Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.01,	2,	0,	8.024,	19.6

"Hydraulic Information for Segment 2"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.216,	2.92,	.16,	1.082

"Initial Mix Values for Segment 2"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.3367,	7.781,	10.078,	4.262,	8.916,	19.05055

modout.txt

"Rate Constants for Segment 2. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1.7, 1.627, 20, 19.555, .55, .511, 0, 0

"Output for Segment 2"
 "Segment starts at UNNAMED TRIBUTARY"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 .15, 0, 7.781, 10.078, 4.262
 .25, .1, 7.801, 9.986, 4.25
 .35, .2, 7.819, 9.895, 4.238
 .366, .216, 7.822, 9.88, 4.236

"END OF FILE"

modout.txt

"Model Run For C:\Documents and Settings\pmp94864\My Documents\working files\BECKY\PERMITS\VPDES\woodhaven\Reissuance 2013\Woodhaven 25000 model data eval 2013 new mod final 2 new temp.mod On 1/22/2013 10:19:50 AM"

"Model is for SOUTH FORK GOOSE CREEK, UT."

"Model starts at the WOODHAVEN NURSING HOME STP discharge."

"Background Data"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.27,	2,	0,	7.931,	19.6

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.025,	30,	16.31,	5.5,	12.2

updates anti degradation

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.15,	2.736,	.14,	1.192

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.295,	7.725,	10.932,	4.884,	8.923,	18.97288

7.931 - 7.725 = 0.206 msl

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.7,	1.622,	20,	19.519,	.55,	.508,	0,	0

"Output for Segment 1"

"Segment starts at WOODHAVEN NURSING HOME STP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	7.725,	10.932,	4.884		
.1,	.1,	7.741,	10.841,	4.871		
.15,	.15,	7.749,	10.796,	4.865		

"Discharge/Tributary Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0317,	2,	0,	7.94,	19.6

"Incremental Flow Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.01,	2,	0,	8.024,	19.6

"Hydraulic Information for Segment 2"

"Length"	"width"	"Depth"	"velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.216,	2.92,	.16,	1.082

"Initial Mix Values for Segment 2"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.3367,	7.775,	10.078,	4.262,	8.916,	19.05055

modout.txt

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.7, 1.627, 20, 19.555, .55, .511, 0, 0

"Output for Segment 2"

"Segment starts at UNNAMED TRIBUTARY"

"Total", "Segm."

"Dist.", "(mi)"	"Dist.", "(mi)"	"DO", "(mg/l)"	"cBOD", "(mg/l)"	"nBOD", "(mg/l)"
.15,	0,	7.775,	10.078,	4.262
.25,	.1,	7.795,	9.986,	4.25
.35,	.2,	7.814,	9.895,	4.238
.366,	.216,	7.817,	9.88,	4.236

"END OF FILE"

modout.txt

"Model Run For C:\Documents and Settings\pmp94864\My Documents\working files\BECKY\PERMITS\VPDES\Woodhaven\Reissuance 2013\Woodhaven 25000 model data eval 2013 new mod final 2 new temp.mod On 1/22/2013 10:23:36 AM"

"Model is for SOUTH FORK GOOSE CREEK, UT."

"Model starts at the WOODHAVEN NURSING HOME STP discharge."

"Background Data"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.27,	2,	0,	7.931,	19.6

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.025,	25,	16.31,	5.5,	12.2

violates antidegradation

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.15,	2.736,	.14,	1.192

7.931-7.725=0.206mg/l

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.295,	7.725,	9.873,	4.884,	8.923,	18.97288

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.5,	1.431,	20,	19.519,	.55,	.508,	0,	0

"Output for Segment 1"

"Segment starts at WOODHAVEN NURSING HOME STP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	7.725,	9.873,	4.884		
.1,	.1,	7.758,	9.801,	4.871		
.15,	.15,	7.774,	9.765,	4.865		

"Discharge/Tributary Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.0317,	2,	0,	7.94,	19.6

"Incremental Flow Input Data for Segment 2"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.01,	2,	0,	8.024,	19.6

"Hydraulic Information for Segment 2"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
.216,	2.92,	.16,	1.082

"Initial Mix Values for Segment 2"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.3367,	7.797,	9.175,	4.262,	8.916,	19.05055

modout.txt

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.5, 1.436, 20, 19.555, .55, .511, 0, 0

"Output for Segment 2"

"Segment starts at UNNAMED TRIBUTARY"

"Total", "Segm."

"Dist.", "Dist.", "DO", "CBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"

.15,	0,	7.797,	9.175,	4.262
.25,	.1,	7.832,	9.101,	4.25
.35,	.2,	7.864,	9.027,	4.238
.366,	.216,	7.869,	9.015,	4.236

"END OF FILE"

modout.txt

"Model Run For C:\Documents and Settings\pmp94864\My Documents\Working
files\BECKY\PERMITS\VPDES\Woodhaven\Reissuance 2013\Woodhaven 25000 model data eval
2013 new mod final 2 new temp.mod On 1/22/2013 10:24:16 AM"

"Model is for SOUTH FORK GOOSE CREEK, UT."

"Model starts at the WOODHAVEN NURSING HOME STP discharge."

"Background Data"

"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.27, 2, 0, 7.931, 19.6

"Discharge/Tributary Input Data for Segment 1"

"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.025, 10, 16.31, 5.5, 12.2

*violates antidegradation
7.931 - 7.700 = 0.231 mg/L*

"Hydraulic Information for Segment 1"

"Length", "width", "Depth", "velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.15, 2.736, .14, 1.192

"Initial Mix Values for Segment 1"

"Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.295, 7.725, 6.695, 4.884, 8.923, 18.97288

"Rate Constants for Segment 1. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.5, 1.431, 20, 19.519, .55, .508, 0, 0

"Output for Segment 1"

"Segment starts at WOODHAVEN NURSING HOME STP"

"Total", "Segm."
"Dist.", "Dist.", "DO", "CBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.725, 6.695, 4.884
.1, .1, 7.78, 6.646, 4.871
.15, .15, 7.806, 6.622, 4.865

"Discharge/Tributary Input Data for Segment 2"

"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.0317, 2, 0, 7.94, 19.6

"Incremental Flow Input Data for Segment 2"

"Flow", "CBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.01, 2, 0, 8.024, 19.6

"Hydraulic Information for Segment 2"

"Length", "width", "Depth", "velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.216, 2.92, .16, 1.082

"Initial Mix Values for Segment 2"

"Flow", "DO", "CBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.3367, 7.825, 6.421, 4.262, 8.916, 19.05055

modout.txt
 "Rate Constants for Segment 2. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 1.5, 1.436, 20, 19.555, .55, .511, 0, 0

"Output for Segment 2"
 "Segment starts at UNNAMED TRIBUTARY"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 .15, 0, 7.825, 6.421, 4.262
 .25, .1, 7.878, 6.369, 4.25
 .35, .2, 7.926, 6.318, 4.238
 .366, .216, 7.933, 6.31, 4.236

"END OF FILE"

Attachment G

Effluent Data

- **DMR Data**
- **Ammonia Background Data**

Woodhaven Nursing Home STP
VA0074870

Effluent pH (S.U.)

Date Due	min	max
10-Aug-08	7	7.5
10-Sep-08	7	7.5
10-Oct-08	7	7.5
10-Nov-08	6.5	7
10-Dec-08	6.5	7
10-Jan-09	6.5	7
10-Feb-09	6.5	7
10-Mar-09	6.5	7
10-Apr-09	6	7
10-May-09	6.5	7
10-Jun-09	6	7
10-Jul-09	6	6.5
10-Aug-09	6.5	7
10-Sep-09	6.5	7
10-Oct-09	6	6.5
10-Nov-09	6	6.5
10-Dec-09	6.5	7
10-Jan-10	6	7
10-Feb-10	6	6.5
10-Mar-10	6.5	7
10-Apr-10	6	7
10-May-10	6.5	7
10-Jun-10	6	7
10-Jul-10	6	7
10-Aug-10	6.5	7
10-Sep-10	6	7
10-Oct-10	6	7
10-Nov-10	6.5	7
10-Dec-10	6.5	7
10-Jan-11	6.5	7
10-Feb-11	6.5	7
10-Mar-11	6.5	7
10-Apr-11	6.5	7
10-May-11	6.5	7
10-Jun-11	6.5	7
10-Jul-11	6.5	7
10-Aug-11	6.5	7
10-Sep-11	6.5	7
10-Oct-11	6.5	7
10-Nov-11	6.5	7
10-Dec-11	6.5	7
10-Jan-12	6.5	7
10-Feb-12	6.5	7
10-Mar-12	6.5	7
10-Apr-12	6.5	7
10-May-12	6.5	7
10-Jun-12	6.5	7
10-Jul-12	6.5	7
10-Aug-12	6.5	7
10-Sep-12	6.5	7

90th Percentile pH 7.0 S.U.
10th Percentile pH 6.0 S.U.

Woodhaven Nursing Home STP
VPDES Permit No. VA0074870

Effluent Temperature Data (°C)

Days	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12
1	11.67	11.67	11.67	9.45	9.45	7.78	7.78	8.89	10	10.00	11.67	11.16
2	11.67	11.67	11.67	9.45	10.56	7.78	7.78	10.00	11.12	10.00	11.67	11.16
3	11.12	11.67	11.67	10.00	10.00	7.76	8.34	9.45	11.12	13.40	12.23	10.56
4	11.12	11.67	11.67	10.56	10.56	7.76	7.23	10.00	11.12	13.40	13.34	10.56
5	11.67	11.67	12.23	10.00	11.12	7.76	7.78	10.00	11.12	10.00	11.12	12.23
6	12.23	11.67	11.12	9.45	11.12	7.23	7.78	9.45	10.56	11.67	11.67	11.67
7	11.12	11.67	11.12	10.56	10.00	7.78	7.23	10.00	10.56	11.67	11.12	11.67
8	11.12	11.67	10.56	10.56	10.00	7.78	7.78	10.00	11.67	13.34	11.67	12.23
9	11.12	11.67	11.12	9.45	8.34	7.78	7.78	9.45	12.23	13.34	11.67	11.67
10	11.12	11.12	11.12	9.45	8.89	7.78	7.78	10.56	11.12	13.34	11.67	12.23
11	11.12	11.12	11.12	10.00	7.23	7.78	7.78	10.56	11.67	12.23	11.67	11.67
12	11.12	11.12	10.00	9.45	8.34	7.79	7.78	10.00	8.59	11.67	11.67	11.12
13	11.67	11.12	11.12	8.89	8.34	7.78	8.34	10.00	10.56	12.23	11.67	11.67
14	12.23	11.67	11.12	9.45	8.34	8.34	8.34	10.56	11.12	12.23	11.67	12.23
15	11.12	11.67	11.12	10.00	8.89	8.34	8.89	9.45	11.12	11.67	11.67	11.67
16	11.67	11.67	11.12	9.45	8.89	7.78	9.45	9.45	11.12	11.67	11.67	12.23
17	11.67	11.12	11.12	9.45	8.34	7.78	10.00	9.45	11.67	11.12	11.12	11.67
18	11.67	11.12	11.12	9.45	7.78	7.79	7.78	9.45	11.67	9.45	12.23	12.23
19	11.67	11.67	11.12	8.89	8.34	7.78	8.89	10.00	11.67	11.12	12.23	11.67
20	11.67	11.12	11.12	10.00	8.34	7.78	8.34	9.45	14.45	11.67	12.23	12.23
21	11.67	11.12	10.00	9.45	8.34	7.78	8.89	10.56	11.67	10.00	12.23	12.23
22	11.67	11.67	10.00	9.45	7.78	7.78	9.45	10.00	10.56	11.12	12.23	12.23
23	11.67	11.67	10.50	8.89	8.89	8.34	10.00	9.45	12.78	8.89	11.12	12.23
24	11.67	11.12	10.00	9.45	8.34	8.34	9.45	9.45	11.12	11.12	11.67	12.23
25	11.67	11.12	10.00	8.89	8.89	8.34	9.45	9.45	10.00	11.67	11.67	13.34
26	12.23	11.12	10.00	10.00	8.89	8.34	10.00	10.00	11.12	11.67	11.67	12.23
27	11.67	11.12	9.45	10.00	8.89	8.34	8.89	9.45	11.67	12.23	11.67	11.12
28	11.67	11.12	10.00	9.45	8.34	8.34	8.89	10.56	11.12	10.00	11.67	12.23
29	11.67	11.12	9.45	9.45	7.78	8.34	9.45	9.45	13.34	11.67	12.23	11.67
30	11.67	11.67	8.89	10.00	7.78	7.78	9.45		13.34	11.12	12.23	11.67
31	11.67	11.67		10.00		7.78	8.89		13.34		12.23	

90th percentile temperature 12.2 °C
 90th percentile temperature 12.2 °C (January - May)

Woodhaven Nursing Home STP
 VPDES Permit No. VA0074870
 (Outfall 001)

Date Due	Flow (MGD)	TRC (mg/L)		BOD ₅ (mg/L)		TSS (mg/L)	
	Average	Average	Maximum	Average	Maximum	Average	Maximum
Limits	0.0048	0.12	0.14	30	45	30	45
10-Jul-08	0.0039			18	18	9	9
10-Aug-08	0.0041	<QL	<QL	15	15	8	8
10-Sep-08	0.0045	<QL	<QL	23	23	9	9
10-Oct-08	0.0031	<QL	<QL	13	13	5	5
10-Nov-08	0.0033	<QL	<QL	18	18	13	13
10-Dec-08	0.0024	<QL	<QL	0	0	18	18
10-Jan-09	0.0011	<QL	<QL	0	0	15	15
10-Feb-09	0.0025	<QL	<QL	4	4	21	21
10-Mar-09	0.0022	<QL	<QL	8	8	16	16
10-Apr-09	0.0022	<QL	<QL	25	25	14	14
10-May-09	0.0029	<QL	<QL	0	0	24	24
10-Jun-09	0.0032	<QL	<QL	28	28	12	12
10-Jul-09	0.0029	<QL	<QL	24	24	10	10
10-Aug-09	0.0027	<QL	<QL	24	24	12	12
10-Sep-09	0.0032	<QL	<QL	23	23	10	10
10-Oct-09	0.0028	<QL	<QL	24	24	16	16
10-Nov-09	0.0033	<QL	<QL	24	24	14	14
10-Dec-09	0.0037	<QL	<QL	15	15	6	6
10-Jan-10	0.003	<QL	<QL	12	12	5	5
10-Feb-10	0.002	<QL	<QL	9	9	20	20
10-Mar-10	0.0023	<QL	<QL	19	19	9	9
10-Apr-10	0.0037	<QL	<QL	22	22	10	10
10-May-10	0.0032	<QL	<QL	5	5	14	14
10-Jun-10	0.0029	<QL	<QL	19	19	16	16
10-Jul-10	0.0036	<QL	<QL	21	21	15	15
10-Aug-10	0.0035	<QL	<QL	18	18	11	11
10-Sep-10	0.0036	<QL	<QL	24	24	10	10
10-Oct-10	0.0038	<QL	<QL	21	21	15	15
10-Nov-10	0.0037	<QL	<QL	21	21	15	15
10-Dec-10	0.0031	<QL	<QL	6	6	17	17
10-Jan-11	0.0025	<QL	<QL	22	22	6	6
10-Feb-11	0.0036	<QL	<QL	0	0	24	24
10-Mar-11	0.0035	<QL	<QL	23	23	10	10
10-Apr-11	0.0037	<QL	<QL	26	26	21	21
10-May-11	0.0032	<QL	<QL	24	24	14	14
10-Jun-11	0.0036	<QL	<QL	X	X	X	X
10-Jul-11	0.0036	<QL	<QL	17	17	8	8
10-Aug-11	0.0036	<QL	<QL	27	27	15	15
10-Sep-11	0.0038	<QL	<QL	29	29	7	7
10-Oct-11	0.0035	<QL	<QL	20	20	14	14
10-Nov-11	0.003	<QL	<QL	21	21	10	10
10-Dec-11	0.0035	<QL	<QL	21	21	12	12
10-Jan-12	0.0036	<QL	<QL	24	24	14	14
10-Feb-12	0.003	<QL	<QL	21	21	9	9
10-Mar-12	0.0032	<QL	<QL	4	4	7	7
10-Apr-12	0.0032	<QL	<QL	21	21	12	12
10-May-12	0.0034	<QL	<QL	0	0	3	3
10-Jun-12	0.0034	<QL	<QL	<QL	<QL	3	3
10-Jul-12	0.0036	<QL	<QL	<QL	<QL	22	22

Woodhaven Nursing Home STP
 VPDES Permit No. VA0074870
 (Outfall 001)

Date Due	Flow (MGD)	TRC (mg/L)		BOD ₅ (mg/L)		TSS (mg/L)	
	Average	Average	Maximum	Average	Maximum	Average	Maximum
10-Aug-12	0.0036	<QL	<QL	21	21	5	5
10-Sep-12	0.0035	<QL	<QL	22	22	8	8
10-Oct-12	0.0043	<QL	<QL	30	30	16	16
10-Nov-12	0.0035	<QL	<QL	10	10	7	7
10-Dec-12	0.0035	<QL	<QL	28	28	8	8

Woodhaven Nursing Home STP
VA0074870

Ammonia as N and TKN Data for Demonstration Project

Date	Ammonia as N (mg/L)	TKN (mg/L)	TKN - Ammonia (mg/L)
3/19/2003	5.400		
3/18/2003		9.840	
3/12/2003	11.700	13.200	1.500
3/6/2003	6.140	10.200	4.060
2/19/2003	0.380	0.860	0.480
2/25/2003	1.920	2.590	0.670
2/12/2003	<0.200	0.790	
2/5/2003	11.000	13.000	2.000
1/29/2003	4.580	5.430	0.850
1/22/2003	7.930	9.950	2.020
1/15/2003	<0.200	0.520	
1/7/2003	<0.200	<0.500	
12/29/2002	1.700	2.180	0.480
12/22/2002	0.860	2.090	1.230
12/17/2002	0.220	0.870	0.650
12/9/2002	1.300	3.860	2.560
12/3/2002	<0.200	<0.500	
11/26/2002	<0.200	0.660	
11/19/2002	<0.200	0.800	
11/12/2002	<0.200	0.840	
11/5/2002	9.770	11.100	1.330
10/26/2002	<0.200	0.650	
10/22/2002	4.970	5.470	0.500

Mean Difference 1.410 mg/L

Woodhaven Nursing Home STP
VA0074870

Estimation Data for Instream Ammonia below Discharge (0.0048 MGD Facility)

Month	Average Effluent Flow (Q _e) (MGD)	Average TKN (mg/L)	TKN (kg/d)	Estimated Ammonia as N (mg/L)	Estimated Ammonia as N (C _e) (kg/d)	Estimated Ammonia Goose Creek, UT at 1Q10 (mg/L)	Estimated Ammonia Goose Creek, UT at 7Q10 (mg/L)
Oct-96	0.0031	13.9	0.163	10.9	0.128	0.124	0.124
Nov-96	0.0025	10.1	0.096	7.1	0.067	0.065	0.065
Dec-96	0.0041	13.4	0.208	10.4	0.162	0.156	0.156
Jan-97	0.0039	16	0.236	13	0.192	0.185	0.185
Feb-97	0.0039	18.7	0.276	15.7	0.232	0.224	0.224
Mar-97	0.0047	3.6	0.064	0.6	0.011	0.010	0.010
May-97	0.0046	7.7	0.134	4.7	0.082	0.079	0.079
Jun-97	0.0043	9.8	0.160	6.8	0.111	0.107	0.107
Jul-97	0.0036	13.1	0.179	10.1	0.138	0.133	0.133
Aug-97	0.0029	10.9	0.120	7.9	0.087	0.084	0.084
Sep-97	0.0027	10.4	0.106	7.4	0.076	0.073	0.073
Oct-97	0.0026	13.9	0.137	10.9	0.107	0.104	0.104

Stream Flow (Q _s)	
1Q10 =	0.27 MGD
7Q10=	0.27 MGD

Instream Estimated Ammonia = $C_e \text{ as kg/d} / ((Q_e \text{ as MGD} + Q_s \text{ as MGD}) * 3.785)$

100% mixing of effluent with stream assumed

Monthly average flow given on DMR used to calculate loadings.

STATS Program Expected Values	
acute conditions	0.110881 mg/L
chronic conditions	0.110881 mg/L

1/22/2013 4:20:50 PM

Facility = Woodhaven Nursing Home STP

Chemical = ammonia background acute & chronic (mg/L)

Chronic averaging period = 30

~~WtAa = 1~~

~~WtAc = 1~~

Q.L. = 0.2

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 12

Expected Value = .110881

Variance = .004426

C.V. = 0.6

97th percentile daily values = .269819

97th percentile 4 day average = .184482

97th percentile 30 day average = .133728

< Q.L. = 11

Model used = BPJ Assumptions, Type 1 data

*Calculations
for Ammonia
Background
Concentration
for Antidegradation
Spreadsheet*

~~No Limit is required for this material~~

The data are:

1996-1997 estimated ammonia data

0.124

0.065

0.156

0.185

0.224

0.01

0.079

0.107

0.133

0.084

0.073

0.104

Attachment H

Wasteload and Limit Calculations

- **0.0048 MGD Facility**
 - **Mixing Zone Calculations (MIXER 2.1)**
 - **Wasteload Allocation Spreadsheet**
 - **STATS Program Results (TRC, Ammonia)**
- **0.0066 MGD Facility**
 - **Mixing Zone Calculations (MIXER 2.1)**
 - **Antidegradation Wasteload Allocation Spreadsheet**
 - **STATS Program Results (TRC, Ammonia)**
- **0.025 MGD Facility**
 - **Mixing Zone Calculations (MIXER 2.1)**
 - **Antidegradation Wasteload Allocation Spreadsheet**
 - **STATS Program Results (TRC, Ammonia)**

Mixing Zone Predictions for

Woodhaven Nursing Home STP

Effluent Flow = 0.0048 MGD
Stream 7Q10 = 0.27 MGD
Stream 30Q10 = 0.28 MGD
Stream 1Q10 = 0.27 MGD
Stream slope = 0.025 ft/ft
Stream width = 2.644 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .1841 ft
Length = 34.47 ft
Velocity = .8738 ft/sec
Residence Time = .0005 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1882 ft
Length = 33.8 ft
Velocity = .8854 ft/sec
Residence Time = .0004 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1841 ft
Length = 34.47 ft
Velocity = .8738 ft/sec
Residence Time = .011 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: **Woodhaven Nursing Home STP**

Permit No.: **VA0074870**

Receiving Stream: **Goose Creek, South Fork, UT**

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO ₃) =	144 mg/L
90% Temperature (Annual) =	19.6 deg C
90% Temperature (Wet season) =	11.9 deg C
90% Maximum pH =	8.2 SU
10% Maximum pH =	7 SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	y
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0.27 MGD
7Q10 (Annual) =	0.27 MGD
30Q10 (Annual) =	0.28 MGD
1Q10 (Wet season) =	0.32 MGD
30Q10 (Wet season) =	0.34 MGD
30Q5 =	0.3 MGD
Harmonic Mean =	0.37 MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO ₃) =	144 mg/L
90% Temp (Annual) =	12.2 deg C
90% Temp (Wet season) =	12.2 deg C
90% Maximum pH =	7 SU
10% Maximum pH =	6 SU
Discharge Flow =	0.0048 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	4.3E+04	6.3E+04	--	--	6.7E+01	9.9E+01	--	--	4.3E+03	6.3E+03	--	--	4.3E+03	6.3E+03
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	3.9E+02	5.9E+02	--	--	6.1E-01	9.3E-01	--	--	3.9E+01	5.9E+01	--	--	3.9E+01	5.9E+01
Acrylonitrile ^c	0	--	--	5.1E-01	2.5E+00	--	--	4.0E+01	2.0E+02	--	--	5.1E-02	2.5E-01	--	--	4.0E+00	2.0E+01	--	--	4.0E+00	2.0E+01
Aldrin ^c	0	3.0E+00	--	4.9E-04	5.0E-04	1.7E+02	--	3.8E-02	3.9E-02	7.5E-01	--	4.9E-05	5.0E-05	4.3E+01	--	3.8E-03	3.9E-03	4.3E+01	--	3.8E-03	3.9E-03
Ammonia-N (mg/l) (Yearly)	0	6.95E+00	1.52E+00	--	--	4.0E+02	9.0E+01	--	--	1.74E+00	3.79E-01	--	--	9.9E+01	2.2E+01	--	--	9.9E+01	2.2E+01	--	--
Ammonia-N (mg/l) (High Flow)	0	6.77E+00	2.04E+00	--	--	4.6E+02	1.5E+02	--	--	1.69E+00	5.10E-01	--	--	1.1E+02	3.7E+01	--	--	1.1E+02	3.7E+01	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	5.3E+05	2.5E+06	--	--	8.3E+02	4.0E+03	--	--	5.3E+04	2.5E+05	--	--	5.3E+04	2.5E+05
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	3.6E+02	4.1E+04	--	--	5.6E-01	6.4E+01	--	--	3.6E+01	4.1E+03	--	--	3.6E+01	4.1E+03
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	1.9E+04	8.6E+03	6.4E+02	--	8.5E+01	3.8E+01	1.0E+00	--	4.9E+03	2.1E+03	6.4E+01	--	4.9E+03	2.1E+03	6.4E+01	--
Barium	0	--	--	2.0E+03	--	--	--	1.3E+05	--	--	--	2.0E+02	--	--	--	1.3E+04	--	--	--	1.3E+04	--
Benzene ^c	0	--	--	2.2E+01	5.1E+02	--	--	1.7E+03	4.0E+04	--	--	2.2E+00	5.1E+01	--	--	1.7E+02	4.0E+03	--	--	1.7E+02	4.0E+03
Benzidine ^c	0	--	--	8.6E-04	2.0E-03	--	--	6.7E-02	1.6E-01	--	--	8.6E-05	2.0E-04	--	--	6.7E-03	1.6E-02	--	--	6.7E-03	1.6E-02
Benzo (a) anthracene ^c	0	--	--	3.8E-02	1.8E-01	--	--	3.0E+00	1.4E+01	--	--	3.8E-03	1.8E-02	--	--	3.0E-01	1.4E+00	--	--	3.0E-01	1.4E+00
Benzo (b) fluoranthene ^c	0	--	--	3.8E-02	1.8E-01	--	--	3.0E+00	1.4E+01	--	--	3.8E-03	1.8E-02	--	--	3.0E-01	1.4E+00	--	--	3.0E-01	1.4E+00
Benzo (k) fluoranthene ^c	0	--	--	3.8E-02	1.8E-01	--	--	3.0E+00	1.4E+01	--	--	3.8E-03	1.8E-02	--	--	3.0E-01	1.4E+00	--	--	3.0E-01	1.4E+00
Benzo (a) pyrene ^c	0	--	--	3.8E-02	1.8E-01	--	--	3.0E+00	1.4E+01	--	--	3.8E-03	1.8E-02	--	--	3.0E-01	1.4E+00	--	--	3.0E-01	1.4E+00
Bis(2-Chloroethyl) Ether ^c	0	--	--	3.0E-01	5.3E+00	--	--	2.3E+01	4.1E+02	--	--	3.0E-02	5.3E-01	--	--	2.3E+00	4.1E+01	--	--	2.3E+00	4.1E+01
Bis(2-Chloroisopropyl) Ether	0	--	--	1.4E+03	6.5E+04	--	--	8.9E+04	4.1E+06	--	--	1.4E+02	6.5E+03	--	--	8.9E+03	4.1E+05	--	--	8.9E+03	4.1E+05
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	1.2E+01	2.2E+01	--	--	9.4E+02	1.7E+03	--	--	1.2E+00	2.2E+00	--	--	9.4E+01	1.7E+02	--	--	9.4E+01	1.7E+02
Bromoform ^c	0	--	--	4.3E+01	1.4E+03	--	--	3.4E+03	1.1E+05	--	--	4.3E+00	1.4E+02	--	--	3.4E+02	1.1E+04	--	--	3.4E+02	1.1E+04
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	9.5E+04	1.2E+05	--	--	1.5E+02	1.9E+02	--	--	9.5E+03	1.2E+04	--	--	9.5E+03	1.2E+04
Cadmium	0	5.9E+00	1.5E+00	5.0E+00	--	3.4E+02	8.6E+01	3.2E+02	--	1.5E+00	3.8E-01	5.0E-01	--	8.5E+01	2.2E+01	3.2E+01	--	8.5E+01	2.2E+01	3.2E+01	--
Carbon Tetrachloride ^c	0	--	--	2.3E+00	1.6E+01	--	--	1.8E+02	1.2E+03	--	--	2.3E-01	1.6E+00	--	--	1.8E+01	1.2E+02	--	--	1.8E+01	1.2E+02
Chlordane ^c	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.4E+02	2.5E-01	6.2E-01	6.3E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	3.4E+01	6.2E-02	6.2E-02	6.3E-02	3.4E+01	6.2E-02	6.2E-02	6.3E-02
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	4.9E+07	1.3E+07	1.6E+07	--	2.2E+05	5.8E+04	2.5E+04	--	1.2E+07	3.3E+06	1.6E+06	--	1.2E+07	3.3E+06	1.6E+06	--
TRC	0	1.9E+01	1.1E+01	--	--	1.1E+03	6.3E+02	--	--	4.8E+00	2.8E+00	--	--	2.7E+02	1.6E+02	--	--	2.7E+02	1.6E+02	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	8.3E+03	1.0E+05	--	--	1.3E+01	1.6E+02	--	--	8.3E+02	1.0E+04	--	--	8.3E+02	1.0E+04

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ⁶	0	--	--	4.0E+00	1.3E+02	--	--	3.1E+02	1.0E+04	--	--	4.0E-01	1.3E+01	--	--	3.1E+01	1.0E+03	--	--	3.1E+01	1.0E+03
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	2.2E+04	7.0E+05	--	--	3.4E+01	1.1E+03	--	--	2.2E+03	7.0E+04	--	--	2.2E+03	7.0E+04
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	6.4E+04	1.0E+05	--	--	1.0E+02	1.6E+02	--	--	6.4E+03	1.0E+04	--	--	6.4E+03	1.0E+04
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	5.1E+03	9.5E+03	--	--	8.1E+00	1.5E+01	--	--	5.1E+02	9.5E+02	--	--	5.1E+02	9.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	4.8E+00	2.3E+00	--	--	2.1E-02	1.0E-02	--	--	1.2E+00	5.9E-01	--	--	1.2E+00	5.9E-01	--	--
Chromium III	0	7.7E+02	1.0E+02	--	--	4.4E+04	5.7E+03	--	--	1.9E+02	2.5E+01	--	--	1.1E+04	1.4E+03	--	--	1.1E+04	1.4E+03	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	9.2E+02	6.3E+02	--	--	4.0E+00	2.8E+00	--	--	2.3E+02	1.6E+02	--	--	2.3E+02	1.6E+02	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	6.4E+03	--	--	--	1.0E+01	--	--	--	6.4E+02	--	--	--	6.4E+02	--
Chrysene ^c	0	--	--	3.8E-03	1.8E-02	--	--	3.0E-01	1.4E+00	--	--	3.8E-04	1.8E-03	--	--	3.0E-02	1.4E-01	--	--	3.0E-02	1.4E-01
Copper	0	1.9E+01	1.2E+01	1.3E+03	--	1.1E+03	7.0E+02	8.3E+04	--	4.7E+00	3.1E+00	1.3E+02	--	2.7E+02	1.8E+02	8.3E+03	--	2.7E+02	1.8E+02	8.3E+03	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.3E+03	3.0E+02	8.9E+03	1.0E+06	5.5E+00	1.3E+00	1.4E+01	1.6E+03	3.1E+02	7.4E+01	8.9E+02	1.0E+05	3.1E+02	7.4E+01	8.9E+02	1.0E+05
DDD ^c	0	--	--	3.1E-03	3.1E-03	--	--	2.4E-01	2.4E-01	--	--	3.1E-04	3.1E-04	--	--	2.4E-02	2.4E-02	--	--	2.4E-02	2.4E-02
DDE ^c	0	--	--	2.2E-03	2.2E-03	--	--	1.7E-01	1.7E-01	--	--	2.2E-04	2.2E-04	--	--	1.7E-02	1.7E-02	--	--	1.7E-02	1.7E-02
DDT ^c	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	6.3E+01	5.7E-02	1.7E-01	1.7E-01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	1.6E+01	1.4E-02	1.7E-02	1.7E-02	1.6E+01	1.4E-02	1.7E-02	1.7E-02
Demeton	0	--	1.0E-01	--	--	--	5.7E+00	--	--	--	2.5E-02	--	--	--	1.4E+00	--	--	--	1.4E+00	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	9.7E+00	9.7E+00	--	--	4.3E-02	4.3E-02	--	--	2.4E+00	2.4E+00	--	--	2.4E+00	2.4E+00	--	--
Dibenz(a,h)anthracene ^c	0	--	--	3.8E-02	1.8E-01	--	--	3.0E+00	1.4E+01	--	--	3.8E-03	1.8E-02	--	--	3.0E-01	1.4E+00	--	--	3.0E-01	1.4E+00
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	2.7E+04	8.3E+04	--	--	4.2E+01	1.3E+02	--	--	2.7E+03	8.3E+03	--	--	2.7E+03	8.3E+03
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	2.0E+04	6.1E+04	--	--	3.2E+01	9.6E+01	--	--	2.0E+03	6.1E+03	--	--	2.0E+03	6.1E+03
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	4.0E+03	1.2E+04	--	--	6.3E+00	1.9E+01	--	--	4.0E+02	1.2E+03	--	--	4.0E+02	1.2E+03
3,3-Dichlorobenzidine ⁶	0	--	--	2.1E-01	2.8E-01	--	--	1.6E+01	2.2E+01	--	--	2.1E-02	2.8E-02	--	--	1.6E+00	2.2E+00	--	--	1.6E+00	2.2E+00
Dichlorobromomethane ^c	0	--	--	5.5E+00	1.7E+02	--	--	4.3E+02	1.3E+04	--	--	5.5E-01	1.7E+01	--	--	4.3E+01	1.3E+03	--	--	4.3E+01	1.3E+03
1,2-Dichloroethane ^c	0	--	--	3.8E+00	3.7E+02	--	--	3.0E+02	2.9E+04	--	--	3.8E-01	3.7E+01	--	--	3.0E+01	2.9E+03	--	--	3.0E+01	2.9E+03
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	2.1E+04	4.5E+05	--	--	3.3E+01	7.1E+02	--	--	2.1E+03	4.5E+04	--	--	2.1E+03	4.5E+04
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	8.9E+03	6.4E+05	--	--	1.4E+01	1.0E+03	--	--	8.9E+02	6.4E+04	--	--	8.9E+02	6.4E+04
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	4.9E+03	1.8E+04	--	--	7.7E+00	2.9E+01	--	--	4.9E+02	1.8E+03	--	--	4.9E+02	1.8E+03
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	6.4E+03	--	--	--	1.0E+01	--	--	--	6.4E+02	--	--	--	6.4E+02	--
1,2-Dichloropropane ^c	0	--	--	5.0E+00	1.5E+02	--	--	3.9E+02	1.2E+04	--	--	5.0E-01	1.5E+01	--	--	3.9E+01	1.2E+03	--	--	3.9E+01	1.2E+03
1,3-Dichloropropene ^c	0	--	--	3.4E+00	2.1E+02	--	--	2.7E+02	1.6E+04	--	--	3.4E-01	2.1E+01	--	--	2.7E+01	1.6E+03	--	--	2.7E+01	1.6E+03
Dieldrin ^c	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.4E+01	3.2E+00	4.1E-02	4.2E-02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	3.4E+00	8.0E-01	4.1E-03	4.2E-03	3.4E+00	8.0E-01	4.1E-03	4.2E-03
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.1E+06	2.8E+06	--	--	1.7E+03	4.4E+03	--	--	1.1E+05	2.8E+05	--	--	1.1E+05	2.8E+05
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	2.4E+04	5.4E+04	--	--	3.8E+01	8.5E+01	--	--	2.4E+03	5.4E+03	--	--	2.4E+03	5.4E+03
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	1.7E+07	7.0E+07	--	--	2.7E+04	1.1E+05	--	--	1.7E+06	7.0E+06	--	--	1.7E+06	7.0E+06
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	1.3E+05	2.9E+05	--	--	2.0E+02	4.5E+02	--	--	1.3E+04	2.9E+04	--	--	1.3E+04	2.9E+04
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	4.4E+03	3.4E+05	--	--	6.9E+00	5.3E+02	--	--	4.4E+02	3.4E+04	--	--	4.4E+02	3.4E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	8.3E+02	1.8E+04	--	--	1.3E+00	2.8E+01	--	--	8.3E+01	1.8E+03	--	--	8.3E+01	1.8E+03
2,4-Dinitrotoluene ^c	0	--	--	1.1E+00	3.4E+01	--	--	8.6E+01	2.7E+03	--	--	1.1E-01	3.4E+00	--	--	8.6E+00	2.7E+02	--	--	8.6E+00	2.7E+02
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	3.2E-06	3.2E-06	--	--	5.0E-09	5.1E-09	--	--	3.2E-07	3.2E-07	--	--	3.2E-07	3.2E-07
1,2-Diphenylhydrazine ⁶	0	--	--	3.6E-01	2.0E+00	--	--	2.8E+01	1.6E+02	--	--	3.6E-02	2.0E-01	--	--	2.8E+00	1.6E+01	--	--	2.8E+00	1.6E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+01	3.2E+00	3.9E+03	5.7E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	3.1E+00	8.0E-01	3.9E+02	5.7E+02	3.1E+00	8.0E-01	3.9E+02	5.7E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.3E+01	3.2E+00	3.9E+03	5.7E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	3.1E+00	8.0E-01	3.9E+02	5.7E+02	3.1E+00	8.0E-01	3.9E+02	5.7E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.3E+01	3.2E+00	--	--	5.5E-02	1.4E-02	--	--	3.1E+00	8.0E-01	--	--	3.1E+00	8.0E-01	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	3.9E+03	5.7E+03	--	--	6.2E+00	8.9E+00	--	--	3.9E+02	5.7E+02	--	--	3.9E+02	5.7E+02
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	4.9E+00	2.1E+00	3.7E+00	3.8E+00	2.2E-02	9.0E-03	5.9E-03	6.0E-03	1.2E+00	5.2E-01	3.7E-01	3.8E-01	1.2E+00	5.2E-01	3.7E-01	3.8E-01
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	1.8E+01	1.9E+01	--	--	2.9E-02	3.0E-02	--	--	1.8E+00	1.9E+00	--	--	1.8E+00	1.9E+00

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	3.4E+04	1.3E+05	--	--	5.3E+01	2.1E+02	--	--	3.4E+03	1.3E+04	--	--	3.4E+03	1.3E+04
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	8.3E+03	8.9E+03	--	--	1.3E+01	1.4E+01	--	--	8.3E+02	8.9E+02	--	--	8.3E+02	8.9E+02
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	7.0E+04	3.4E+05	--	--	1.1E+02	5.3E+02	--	--	7.0E+03	3.4E+04	--	--	7.0E+03	3.4E+04
Foaming Agents	0	--	--	5.0E+02	--	--	--	3.2E+04	--	--	--	5.0E+01	--	--	--	3.2E+03	--	--	--	3.2E+03	--
Guthion	0	--	1.0E-02	--	--	--	5.7E-01	--	--	--	2.5E-03	--	--	--	1.4E-01	--	--	--	1.4E-01	--	--
Heptachlor ^c	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	3.0E+01	2.2E-01	6.2E-02	6.2E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	7.4E+00	5.4E-02	6.2E-03	6.2E-03	7.4E+00	5.4E-02	6.2E-03	6.2E-03
Heptachlor Epoxide ^d	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	3.0E+01	2.2E-01	3.0E-02	3.0E-02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	7.4E+00	5.4E-02	3.0E-03	3.0E-03	7.4E+00	5.4E-02	3.0E-03	3.0E-03
Hexachlorobenzene ^d	0	--	--	2.8E-03	2.9E-03	--	--	2.2E-01	2.3E-01	--	--	2.8E-04	2.9E-04	--	--	2.2E-02	2.3E-02	--	--	2.2E-02	2.3E-02
Hexachlorobutadiene ^d	0	--	--	4.4E+00	1.8E+02	--	--	3.4E+02	1.4E+04	--	--	4.4E-01	1.8E+01	--	--	3.4E+01	1.4E+03	--	--	3.4E+01	1.4E+03
Hexachlorocyclohexane Alpha-BHC ^c	0	--	--	2.6E-02	4.9E-02	--	--	2.0E+00	3.8E+00	--	--	2.6E-03	4.9E-03	--	--	2.0E-01	3.8E-01	--	--	2.0E-01	3.8E-01
Hexachlorocyclohexane Beta-BHC ^c	0	--	--	9.1E-02	1.7E-01	--	--	7.1E+00	1.3E+01	--	--	9.1E-03	1.7E-02	--	--	7.1E-01	1.3E+00	--	--	7.1E-01	1.3E+00
Hexachlorocyclohexane Gamma-BHC ^c (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	5.4E+01	--	7.7E+01	1.4E+02	2.4E-01	--	9.8E-02	1.8E-01	1.4E+01	--	7.7E+00	1.4E+01	1.4E+01	--	7.7E+00	1.4E+01
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	2.5E+03	7.0E+04	--	--	4.0E+00	1.1E+02	--	--	2.5E+02	7.0E+03	--	--	2.5E+02	7.0E+03
Hexachloroethane ^d	0	--	--	1.4E+01	3.3E+01	--	--	1.1E+03	2.6E+03	--	--	1.4E+00	3.3E+00	--	--	1.1E+02	2.6E+02	--	--	1.1E+02	2.6E+02
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	1.1E+02	--	--	--	5.0E-01	--	--	--	2.9E+01	--	--	--	2.9E+01	--	--
Indeno (1,2,3-cd) pyrene ^c	0	--	--	3.8E-02	1.8E-01	--	--	3.0E+00	1.4E+01	--	--	3.8E-03	1.8E-02	--	--	3.0E-01	1.4E+00	--	--	3.0E-01	1.4E+00
Iron	0	--	--	3.0E+02	--	--	--	1.9E+04	--	--	--	3.0E+01	--	--	--	1.9E+03	--	--	--	1.9E+03	--
Isophorone ^d	0	--	--	3.5E+02	9.6E+03	--	--	2.7E+04	7.5E+05	--	--	3.5E+01	9.6E+02	--	--	2.7E+03	7.5E+04	--	--	2.7E+03	7.5E+04
Kepon	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Lead	0	1.9E+02	2.1E+01	1.5E+01	--	1.1E+04	1.2E+03	9.5E+02	--	4.7E+01	5.4E+00	1.5E+00	--	2.7E+03	3.1E+02	9.5E+01	--	2.7E+03	3.1E+02	9.5E+01	--
Malathion	0	--	1.0E-01	--	--	--	5.7E+00	--	--	--	2.5E-02	--	--	--	1.4E+00	--	--	--	1.4E+00	--	--
Manganese	0	--	--	5.0E+01	--	--	--	3.2E+03	--	--	--	5.0E+00	--	--	--	3.2E+02	--	--	--	3.2E+02	--
Mercury	0	1.4E+00	7.7E-01	--	--	8.0E+01	4.4E+01	--	--	3.5E-01	1.9E-01	--	--	2.0E+01	1.1E+01	--	--	2.0E+01	1.1E+01	--	--
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	3.0E+03	9.5E+04	--	--	4.7E+00	1.5E+02	--	--	3.0E+02	9.5E+03	--	--	3.0E+02	9.5E+03
Methylene Chloride ^c	0	--	--	4.6E+01	5.9E+03	--	--	3.6E+03	4.6E+05	--	--	4.6E+00	5.9E+02	--	--	3.6E+02	4.6E+04	--	--	3.6E+02	4.6E+04
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	1.7E+00	6.4E+03	--	--	7.5E-03	1.0E+01	--	--	4.3E-01	6.4E+02	--	--	4.3E-01	6.4E+02	--
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Nickel	0	2.5E+02	2.8E+01	6.1E+02	4.6E+03	1.4E+04	1.6E+03	3.9E+04	2.9E+05	6.2E+01	6.9E+00	6.1E+01	4.6E+02	3.6E+03	3.9E+02	3.9E+03	2.9E+04	3.6E+03	3.9E+02	3.9E+03	2.9E+04
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	6.4E+05	--	--	--	1.0E+03	--	--	--	6.4E+04	--	--	--	6.4E+04	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.1E+03	4.4E+04	--	--	1.7E+00	6.9E+01	--	--	1.1E+02	4.4E+03	--	--	1.1E+02	4.4E+03
N-Nitrosodimethylamine ^d	0	--	--	6.9E-03	3.0E+01	--	--	5.4E-01	2.3E+03	--	--	6.9E-04	3.0E+00	--	--	5.4E-02	2.3E+02	--	--	5.4E-02	2.3E+02
N-Nitrosodiphenylamine ^d	0	--	--	3.3E+01	6.0E+01	--	--	2.6E+03	4.7E+03	--	--	3.3E+00	6.0E+00	--	--	2.6E+02	4.7E+02	--	--	2.6E+02	4.7E+02
N-Nitrosodi-n-propylamine ^d	0	--	--	5.0E-02	5.1E+00	--	--	3.9E+00	4.0E+02	--	--	5.0E-03	5.1E-01	--	--	3.9E-01	4.0E+01	--	--	3.9E-01	4.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.6E+03	3.8E+02	--	--	7.0E+00	1.7E+00	--	--	4.0E+02	9.4E+01	--	--	4.0E+02	9.4E+01	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	3.7E+00	7.4E-01	--	--	1.6E-02	3.3E-03	--	--	9.3E-01	1.9E-01	--	--	9.3E-01	1.9E-01	--	--
PCB Total ^f	0	--	1.4E-02	6.4E-04	6.4E-04	--	8.0E-01	5.0E-02	5.0E-02	--	3.5E-03	6.4E-05	6.4E-05	--	2.0E-01	5.0E-03	5.0E-03	--	2.0E-01	5.0E-03	5.0E-03
Pentachlorophenol ^c	0	8.2E+00	6.3E+00	2.7E+00	3.0E+01	4.7E+02	3.6E+02	2.1E+02	2.3E+03	2.0E+00	1.6E+00	2.7E-01	3.0E+00	1.2E+02	9.0E+01	2.1E+01	2.3E+02	1.2E+02	9.0E+01	2.1E+01	2.3E+02
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	6.4E+05	5.5E+07	--	--	1.0E+03	8.6E+04	--	--	6.4E+04	5.5E+06	--	--	6.4E+04	5.5E+06
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	5.3E+04	2.5E+05	--	--	8.3E+01	4.0E+02	--	--	5.3E+03	2.5E+04	--	--	5.3E+03	2.5E+04
Radionuclides Gross Alpha Activity (pCi/L)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	2.5E+02	2.5E+02	--	--	4.0E-01	4.0E-01	--	--	2.5E+01	2.5E+01	--	--	2.5E+01	2.5E+01
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	3.2E+02	--	--	--	5.0E-01	--	--	--	3.2E+01	--	--	--	3.2E+01	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	1.9E+03	--	--	--	3.0E+00	--	--	--	1.9E+02	--	--	--	1.9E+02	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.1E+03	2.9E+02	1.1E+04	2.7E+05	5.0E+00	1.3E+00	1.7E+01	4.2E+02	2.9E+02	7.2E+01	1.1E+03	2.7E+04	2.9E+02	7.2E+01	1.1E+03	2.7E+04
Silver	0	6.5E+00	--	--	--	3.7E+02	--	--	--	1.6E+00	--	--	--	9.2E+01	--	--	--	9.2E+01	--	--	--
Sulfate	0	--	--	2.5E+05	--	--	--	1.6E+07	--	--	--	2.5E+04	--	--	--	1.6E+06	--	--	--	1.6E+06	--
1,1,2,2-Tetrachloroethane ^d	0	--	--	1.7E+00	4.0E+01	--	--	1.3E+02	3.1E+03	--	--	1.7E-01	4.0E+00	--	--	1.3E+01	3.1E+02	--	--	1.3E+01	3.1E+02
Tetrachloroethylene ^d	0	--	--	6.9E+00	3.3E+01	--	--	5.4E+02	2.6E+03	--	--	6.9E-01	3.3E+00	--	--	5.4E+01	2.6E+02	--	--	5.4E+01	2.6E+02
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	1.5E+01	3.0E+01	--	--	2.4E-02	4.7E-02	--	--	1.5E+00	3.0E+00	--	--	1.5E+00	3.0E+00
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	3.2E+04	3.8E+05	--	--	5.1E+01	6.0E+02	--	--	3.2E+03	3.8E+04	--	--	3.2E+03	3.8E+04
Total dissolved solids	0	--	--	5.0E+05	--	--	--	3.2E+07	--	--	--	5.0E+04	--	--	--	3.2E+06	--	--	--	3.2E+06	--
Toxaphene ^c	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	4.2E+01	1.1E-02	2.2E-01	2.2E-01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	1.0E+01	2.9E-03	2.2E-02	2.2E-02	1.0E+01	2.9E-03	2.2E-02	2.2E-02
Tributyltin	0	4.6E-01	7.2E-02	--	--	2.6E+01	4.1E+00	--	--	1.2E-01	1.8E-02	--	--	6.6E+00	1.0E+00	--	--	6.6E+00	1.0E+00	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	2.2E+03	4.4E+03	--	--	3.5E+00	7.0E+00	--	--	2.2E+02	4.4E+02	--	--	2.2E+02	4.4E+02
1,1,2-Trichloroethane ^d	0	--	--	5.9E+00	1.6E+02	--	--	4.6E+02	1.2E+04	--	--	5.9E-01	1.6E+01	--	--	4.6E+01	1.2E+03	--	--	4.6E+01	1.2E+03
Trichloroethylene ^c	0	--	--	2.5E+01	3.0E+02	--	--	2.0E+03	2.3E+04	--	--	2.5E+00	3.0E+01	--	--	2.0E+02	2.3E+03	--	--	2.0E+02	2.3E+03
2,4,6-Trichloropheno ^c	0	--	--	1.4E+01	2.4E+01	--	--	1.1E+03	1.9E+03	--	--	1.4E+00	2.4E+00	--	--	1.1E+02	1.9E+02	--	--	1.1E+02	1.9E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	3.2E+03	--	--	--	5.0E+00	--	--	--	3.2E+02	--	--	--	3.2E+02	--
Vinyl Chloride ^d	0	--	--	2.5E-01	2.4E+01	--	--	2.0E+01	1.9E+03	--	--	2.5E-02	2.4E+00	--	--	2.0E+00	1.9E+02	--	--	2.0E+00	1.9E+02
Zinc	0	1.6E+02	1.6E+02	7.4E+03	2.6E+04	9.1E+03	9.2E+03	4.7E+05	1.7E+06	4.0E+01	4.0E+01	7.4E+02	2.6E+03	2.3E+03	2.3E+03	4.7E+04	1.7E+05	2.3E+03	2.3E+03	4.7E+04	1.7E+05

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = $(0.25(WQC - \text{background conc.}) + \text{background conc.})$ for acute and chronic
= $(0.1(WQC - \text{background conc.}) + \text{background conc.})$ for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	3.6E+01
Arsenic	6.4E+01
Barium	1.3E+04
Cadmium	1.3E+01
Chromium III	8.6E+02
Chromium VI	9.2E+01
Copper	1.1E+02
Iron	1.9E+03
Lead	9.5E+01
Manganese	3.2E+02
Mercury	6.6E+00
Nickel	2.4E+02
Selenium	4.3E+01
Silver	3.7E+01
Zinc	9.1E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.005 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD) 0.005					<u>Ammonia - Dry Season - Acute</u>		<u>Ammonia - Dry Season - Chronic</u>	
Stream Flows		Total Mix Flows			90th Percentile pH (SU)	8.100	90th Percentile Temp. (deg C)	19.475
<u>Allocated to Mix (MGD)</u>		<u>Stream + Discharge (MGD)</u>			(7.204 - pH)	-0.896	90th Percentile pH (SU)	8.103
<u>Dry Season</u>	<u>Wet Season</u>	<u>Dry Season</u>	<u>Wet Season</u>		(pH - 7.204)	0.896	MIN	2.070
1Q10	0.270	0.320	0.275	0.325	Trout Present Criterion (mg N/l)	4.642	MAX	19.475
7Q10	0.270	N/A	0.275	N/A	Trout Absent Criterion (mg N/L)	6.950	(7.688 - pH)	-0.415
30Q10	0.280	0.340	0.285	0.345	Trout Present?	n	(pH - 7.688)	0.415
30Q5	0.300	N/A	0.305	N/A	Effective Criterion (mg N/L)	6.950	Early LS Present Criterion (mg N)	1.517
Harm. Mean	0.370	N/A	0.375	N/A			Early LS Absent Criterion (mg N)	1.517
Annual Avg.	0.000	N/A	0.005	N/A			Early Life Stages Present?	y
							Effective Criterion (mg N/L)	1.517
<u>Stream/Discharge Mix Values</u>					<u>Ammonia - Wet Season - Acute</u>		<u>Ammonia - Wet Season - Chronic</u>	
		<u>Dry Season</u>	<u>Wet Season</u>		90th Percentile pH (SU)	8.114	90th Percentile Temp. (deg C)	11.904
1Q10 90th% Temp. Mix (deg C)		19.471	11.904		(7.204 - pH)	-0.910	90th Percentile pH (SU)	8.118
30Q10 90th% Temp. Mix (deg C)		19.475	11.904		(pH - 7.204)	0.910	MIN	2.850
1Q10 90th% pH Mix (SU)		8.100	8.114		Trout Present Criterion (mg N/l)	4.519	MAX	11.904
30Q10 90th% pH Mix (SU)		8.103	8.118		Trout Absent Criterion (mg N/L)	6.766	(7.688 - pH)	-0.430
1Q10 10th% pH Mix (SU)		6.937	N/A		Trout Present?	n	(pH - 7.688)	0.430
7Q10 10th% pH Mix (SU)		6.937	N/A		Effective Criterion (mg N/L)	6.766	Early LS Present Criterion (mg N)	2.039
		<u>Calculated</u>	<u>Formula Inputs</u>				Early LS Absent Criterion (mg N)	2.413
1Q10 Hardness (mg/L as CaCO3)		144.0	144.0				Early Life Stages Present?	y
7Q10 Hardness (mg/L as CaCO3)		144.0	144.0				Effective Criterion (mg N/L)	2.039

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Facility = Woodhaven Nursing Home STP (0.0048 MGD)

Chemical = ammonia (mg/L)

Chronic averaging period = 30

WLAa = 400

WLAc =

Q.L. = 0.2

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

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Facility = Woodhaven Nursing Home WWTP

Chemical = TRC (ug/L) 0.0048 MGD

Chronic averaging period = 4

WLAa = 270

WLAc = 160

Q.L. = 100

samples/mo. = 30

samples/wk. = 8

Summary of Statistics:

observations = 1

Expected Value = 1000

Variance = 360000

C.V. = 0.6

97th percentile daily values = 2433.41

97th percentile 4 day average = 1663.79

97th percentile 30 day average = 1206.05

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 234.011965448517

Average Weekly limit = 139.589327552015

Average Monthly Limit = 115.981282674557

The data are:

1000

0.0066 MGD Facility

Mixing Zone Predictions for

Woodhaven Nursing Home STP

Effluent Flow = 0.0066 MGD
Stream 7Q10 = 0.27 MGD
Stream 30Q10 = 0.28 MGD
Stream 1Q10 = 0.27 MGD
Stream slope = 0.025 ft/ft
Stream width = 2.661 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .1835 ft
Length = 35.11 ft
Velocity = .8742 ft/sec
Residence Time = .0005 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1882 ft
Length = 34.25 ft
Velocity = .8857 ft/sec
Residence Time = .0004 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1835 ft
Length = 35.11 ft
Velocity = .8742 ft/sec
Residence Time = .0112 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: **Woodhaven Nursing Home STP**

Permit No.: **VA0074870**

Receiving Stream: **Goose Creek, South Fork, UT**

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	144 mg/L
90% Temperature (Annual) =	19.6 deg C
90% Temperature (Wet season) =	11.9 deg C
90% Maximum pH =	8.2 SU
10% Maximum pH =	7 SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	y
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0.27 MGD
7Q10 (Annual) =	0.27 MGD
30Q10 (Annual) =	0.28 MGD
1Q10 (Wet season) =	0.32 MGD
30Q10 (Wet season) =	0.34 MGD
30Q5 =	0.3 MGD
Harmonic Mean =	0.37 MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	144 mg/L
90% Temp (Annual) =	12.2 deg C
90% Temp (Wet season) =	12.2 deg C
90% Maximum pH =	7 SU
10% Maximum pH =	6 SU
Discharge Flow =	0.0066 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	3.1E+04	4.6E+04	--	--	6.7E+01	9.9E+01	--	--	3.1E+03	4.6E+03	--	--	3.1E+03	4.6E+03
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	2.8E+02	4.3E+02	--	--	6.1E-01	9.3E-01	--	--	2.8E+01	4.3E+01	--	--	2.8E+01	4.3E+01
Acrylonitrile ^c	0	--	--	5.1E-01	2.5E+00	--	--	2.9E+01	1.4E+02	--	--	5.1E-02	2.5E-01	--	--	2.9E+00	1.4E+01	--	--	2.9E+00	1.4E+01
Aldrin ^c	0	3.0E+00	--	4.9E-04	5.0E-04	1.3E+02	--	2.8E-02	2.9E-02	7.5E-01	--	4.9E-05	5.0E-05	3.1E+01	--	2.8E-03	2.9E-03	3.1E+01	--	2.8E-03	2.9E-03
Ammonia-N (mg/l) (Yearly)	0.110881	7.38E+00	1.59E+00	--	--	3.0E+02	6.5E+01	--	--	1.93E+00	4.82E-01	--	--	7.6E+01	1.6E+01	--	--	7.6E+01	1.6E+01	--	--
Ammonia-N (mg/l) (High Flow)	0.110881	7.14E+00	2.12E+00	--	--	3.5E+02	1.1E+02	--	--	1.87E+00	6.14E-01	--	--	8.7E+01	2.7E+01	--	--	8.7E+01	2.7E+01	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	3.9E+05	1.9E+06	--	--	8.3E+02	4.0E+03	--	--	3.9E+04	1.9E+05	--	--	3.9E+04	1.9E+05
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	2.6E+02	3.0E+04	--	--	5.6E-01	6.4E+01	--	--	2.6E+01	3.0E+03	--	--	2.6E+01	3.0E+03
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	1.4E+04	6.3E+03	4.6E+02	--	8.5E+01	3.8E+01	1.0E+00	--	3.6E+03	1.6E+03	4.6E+01	--	3.6E+03	1.6E+03	4.6E+01	--
Barium	0	--	--	2.0E+03	--	--	--	9.3E+04	--	--	--	2.0E+02	--	--	--	9.3E+03	--	--	--	9.3E+03	--
Benzene ^c	0	--	--	2.2E+01	5.1E+02	--	--	1.3E+03	2.9E+04	--	--	2.2E+00	5.1E+01	--	--	1.3E+02	2.9E+03	--	--	1.3E+02	2.9E+03
Benzidine ^c	0	--	--	8.6E-04	2.0E-03	--	--	4.9E-02	1.1E-01	--	--	8.6E-05	2.0E-04	--	--	4.9E-03	1.1E-02	--	--	4.9E-03	1.1E-02
Benzo (a) anthracene ^c	0	--	--	3.8E-02	1.8E-01	--	--	2.2E+00	1.0E+01	--	--	3.8E-03	1.8E-02	--	--	2.2E-01	1.0E+00	--	--	2.2E-01	1.0E+00
Benzo (b) fluoranthene ^c	0	--	--	3.8E-02	1.8E-01	--	--	2.2E+00	1.0E+01	--	--	3.8E-03	1.8E-02	--	--	2.2E-01	1.0E+00	--	--	2.2E-01	1.0E+00
Benzo (k) fluoranthene ^c	0	--	--	3.8E-02	1.8E-01	--	--	2.2E+00	1.0E+01	--	--	3.8E-03	1.8E-02	--	--	2.2E-01	1.0E+00	--	--	2.2E-01	1.0E+00
Benzo (a) pyrene ^c	0	--	--	3.8E-02	1.8E-01	--	--	2.2E+00	1.0E+01	--	--	3.8E-03	1.8E-02	--	--	2.2E-01	1.0E+00	--	--	2.2E-01	1.0E+00
Bis(2-Chloroethyl) Ether ^c	0	--	--	3.0E-01	5.3E+00	--	--	1.7E+01	3.0E+02	--	--	3.0E-02	5.3E-01	--	--	1.7E+00	3.0E+01	--	--	1.7E+00	3.0E+01
Bis(2-Chloroisopropyl) Ether	0	--	--	1.4E+03	6.5E+04	--	--	6.5E+04	3.0E+06	--	--	1.4E+02	6.5E+03	--	--	6.5E+03	3.0E+05	--	--	6.5E+03	3.0E+05
Bis(2-Ethylhexyl) Phthalate ^c	0	--	--	1.2E+01	2.2E+01	--	--	6.8E+02	1.3E+03	--	--	1.2E+00	2.2E+00	--	--	6.8E+01	1.3E+02	--	--	6.8E+01	1.3E+02
Bromoform ^c	0	--	--	4.3E+01	1.4E+03	--	--	2.5E+03	8.0E+04	--	--	4.3E+00	1.4E+02	--	--	2.5E+02	8.0E+03	--	--	2.5E+02	8.0E+03
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	7.0E+04	8.8E+04	--	--	1.5E+02	1.9E+02	--	--	7.0E+03	8.8E+03	--	--	7.0E+03	8.8E+03
Cadmium	0	5.9E+00	1.5E+00	5.0E+00	--	2.5E+02	6.3E+01	2.3E+02	--	1.5E+00	3.8E-01	5.0E-01	--	6.2E+01	1.6E+01	2.3E+01	--	6.2E+01	1.6E+01	2.3E+01	--
Carbon Tetrachloride ^c	0	--	--	2.3E+00	1.6E+01	--	--	1.3E+02	9.1E+02	--	--	2.3E-01	1.6E+00	--	--	1.3E+01	9.1E+01	--	--	1.3E+01	9.1E+01
Chlordane ^c	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.0E+02	1.8E-01	4.6E-01	4.6E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	2.5E+01	4.5E-02	4.6E-02	4.6E-02	2.5E+01	4.5E-02	4.6E-02	4.6E-02
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	3.6E+07	9.6E+06	1.2E+07	--	2.2E+05	5.8E+04	2.5E+04	--	9.0E+06	2.4E+06	1.2E+06	--	9.0E+06	2.4E+06	1.2E+06	--
TRC	0	1.9E+01	1.1E+01	--	--	8.0E+02	4.6E+02	--	--	4.8E+00	2.8E+00	--	--	2.0E+02	1.2E+02	--	--	2.0E+02	1.2E+02	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	6.0E+03	7.4E+04	--	--	1.3E+01	1.6E+02	--	--	6.0E+02	7.4E+03	--	--	6.0E+02	7.4E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ⁶	0	--	--	4.0E+00	1.3E+02	--	--	2.3E+02	7.4E+03	--	--	4.0E-01	1.3E+01	--	--	2.3E+01	7.4E+02	--	--	2.3E+01	7.4E+02
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	1.6E+04	5.1E+05	--	--	3.4E+01	1.1E+03	--	--	1.6E+03	5.1E+04	--	--	1.6E+03	5.1E+04
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	4.6E+04	7.4E+04	--	--	1.0E+02	1.6E+02	--	--	4.6E+03	7.4E+03	--	--	4.6E+03	7.4E+03
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	3.8E+03	7.0E+03	--	--	8.1E+00	1.5E+01	--	--	3.8E+02	7.0E+02	--	--	3.8E+02	7.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	3.5E+00	1.7E+00	--	--	2.1E-02	1.0E-02	--	--	8.7E-01	4.3E-01	--	--	8.7E-01	4.3E-01	--	--
Chromium III	0	7.7E+02	1.0E+02	--	--	3.2E+04	4.2E+03	--	--	1.9E+02	2.5E+01	--	--	8.0E+03	1.0E+03	--	--	8.0E+03	1.0E+03	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	6.7E+02	4.6E+02	--	--	4.0E+00	2.8E+00	--	--	1.7E+02	1.2E+02	--	--	1.7E+02	1.2E+02	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	4.6E+03	--	--	--	1.0E+01	--	--	--	4.6E+02	--	--	--	4.6E+02	--
Chrysene ^c	0	--	--	3.8E-03	1.8E-02	--	--	2.2E-01	1.0E+00	--	--	3.8E-04	1.8E-03	--	--	2.2E-02	1.0E-01	--	--	2.2E-02	1.0E-01
Copper	0	1.9E+01	1.2E+01	1.3E+03	--	7.9E+02	5.1E+02	6.0E+04	--	4.7E+00	3.1E+00	1.3E+02	--	2.0E+02	1.3E+02	6.0E+03	--	2.0E+02	1.3E+02	6.0E+03	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	9.2E+02	2.2E+02	6.5E+03	7.4E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	2.3E+02	5.4E+01	6.5E+02	7.4E+04	2.3E+02	5.4E+01	6.5E+02	7.4E+04
DDD ^c	0	--	--	3.1E-03	3.1E-03	--	--	1.8E-01	1.8E-01	--	--	3.1E-04	3.1E-04	--	--	1.8E-02	1.8E-02	--	--	1.8E-02	1.8E-02
DDE ^c	0	--	--	2.2E-03	2.2E-03	--	--	1.3E-01	1.3E-01	--	--	2.2E-04	2.2E-04	--	--	1.3E-02	1.3E-02	--	--	1.3E-02	1.3E-02
DDT ^c	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	4.6E+01	4.2E-02	1.3E-01	1.3E-01	2.8E-01	2.5E-04	2.2E-04	2.2E-04	1.2E+01	1.0E-02	1.3E-02	1.3E-02	1.2E+01	1.0E-02	1.3E-02	1.3E-02
Demeton	0	--	1.0E-01	--	--	--	4.2E+00	--	--	--	2.5E-02	--	--	--	1.0E+00	--	--	--	1.0E+00	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	7.1E+00	7.1E+00	--	--	4.3E-02	4.3E-02	--	--	1.8E+00	1.8E+00	--	--	1.8E+00	1.8E+00	--	--
Dibenz(a,h)anthracene ^c	0	--	--	3.8E-02	1.8E-01	--	--	2.2E+00	1.0E+01	--	--	3.8E-03	1.8E-02	--	--	2.2E-01	1.0E+00	--	--	2.2E-01	1.0E+00
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	2.0E+04	6.0E+04	--	--	4.2E+01	1.3E+02	--	--	2.0E+03	6.0E+03	--	--	2.0E+03	6.0E+03
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	1.5E+04	4.5E+04	--	--	3.2E+01	9.6E+01	--	--	1.5E+03	4.5E+03	--	--	1.5E+03	4.5E+03
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	2.9E+03	8.8E+03	--	--	6.3E+00	1.9E+01	--	--	2.9E+02	8.8E+02	--	--	2.9E+02	8.8E+02
3,3-Dichlorobenzidine ⁶	0	--	--	2.1E-01	2.8E-01	--	--	1.2E+01	1.6E+01	--	--	2.1E-02	2.8E-02	--	--	1.2E+00	1.6E+00	--	--	1.2E+00	1.6E+00
Dichlorobromomethane ^c	0	--	--	5.5E+00	1.7E+02	--	--	3.1E+02	9.7E+03	--	--	5.5E-01	1.7E+01	--	--	3.1E+01	9.7E+02	--	--	3.1E+01	9.7E+02
1,2-Dichloroethane ^c	0	--	--	3.8E+00	3.7E+02	--	--	2.2E+02	2.1E+04	--	--	3.8E-01	3.7E+01	--	--	2.2E+01	2.1E+03	--	--	2.2E+01	2.1E+03
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	1.5E+04	3.3E+05	--	--	3.3E+01	7.1E+02	--	--	1.5E+03	3.3E+04	--	--	1.5E+03	3.3E+04
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	6.5E+03	4.6E+05	--	--	1.4E+01	1.0E+03	--	--	6.5E+02	4.6E+04	--	--	6.5E+02	4.6E+04
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	3.6E+03	1.3E+04	--	--	7.7E+00	2.9E+01	--	--	3.6E+02	1.3E+03	--	--	3.6E+02	1.3E+03
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	4.6E+03	--	--	--	1.0E+01	--	--	--	4.6E+02	--	--	--	4.6E+02	--
1,2-Dichloropropane ⁶	0	--	--	5.0E+00	1.5E+02	--	--	2.9E+02	8.6E+03	--	--	5.0E-01	1.5E+01	--	--	2.9E+01	8.6E+02	--	--	2.9E+01	8.6E+02
1,3-Dichloropropene ^c	0	--	--	3.4E+00	2.1E+02	--	--	1.9E+02	1.2E+04	--	--	3.4E-01	2.1E+01	--	--	1.9E+01	1.2E+03	--	--	1.9E+01	1.2E+03
Dieldrin ^c	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.0E+01	2.3E+00	3.0E-02	3.1E-02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	2.5E+00	5.9E-01	3.0E-03	3.1E-03	2.5E+00	5.9E-01	3.0E-03	3.1E-03
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	7.9E+05	2.0E+06	--	--	1.7E+03	4.4E+03	--	--	7.9E+04	2.0E+05	--	--	7.9E+04	2.0E+05
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	1.8E+04	3.9E+04	--	--	3.8E+01	8.5E+01	--	--	1.8E+03	3.9E+03	--	--	1.8E+03	3.9E+03
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	1.3E+07	5.1E+07	--	--	2.7E+04	1.1E+05	--	--	1.3E+06	5.1E+06	--	--	1.3E+06	5.1E+06
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	9.3E+04	2.1E+05	--	--	2.0E+02	4.5E+02	--	--	9.3E+03	2.1E+04	--	--	9.3E+03	2.1E+04
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	3.2E+03	2.5E+05	--	--	6.9E+00	5.3E+02	--	--	3.2E+02	2.5E+04	--	--	3.2E+02	2.5E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	6.0E+02	1.3E+04	--	--	1.3E+00	2.8E+01	--	--	6.0E+01	1.3E+03	--	--	6.0E+01	1.3E+03
2,4-Dinitrotoluene ^c	0	--	--	1.1E+00	3.4E+01	--	--	6.3E+01	1.9E+03	--	--	1.1E-01	3.4E+00	--	--	6.3E+00	1.9E+02	--	--	6.3E+00	1.9E+02
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	2.3E-06	2.4E-06	--	--	5.0E-09	5.1E-09	--	--	2.3E-07	2.4E-07	--	--	2.3E-07	2.4E-07
1,2-Diphenylhydrazine ⁶	0	--	--	3.6E-01	2.0E+00	--	--	2.1E+01	1.1E+02	--	--	3.6E-02	2.0E-01	--	--	2.1E+00	1.1E+01	--	--	2.1E+00	1.1E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	9.2E+00	2.3E+00	2.9E+03	4.1E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	2.3E+00	5.9E-01	2.9E+02	4.1E+02	2.3E+00	5.9E-01	2.9E+02	4.1E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	9.2E+00	2.3E+00	2.9E+03	4.1E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	2.3E+00	5.9E-01	2.9E+02	4.1E+02	2.3E+00	5.9E-01	2.9E+02	4.1E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	9.2E+00	2.3E+00	--	--	5.5E-02	1.4E-02	--	--	2.3E+00	5.9E-01	--	--	2.3E+00	5.9E-01	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	2.9E+03	4.1E+03	--	--	6.2E+00	8.9E+00	--	--	2.9E+02	4.1E+02	--	--	2.9E+02	4.1E+02
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	3.6E+00	1.5E+00	2.7E+00	2.8E+00	2.2E-02	9.0E-03	5.9E-03	6.0E-03	9.0E-01	3.8E-01	2.7E-01	2.8E-01	9.0E-01	3.8E-01	2.7E-01	2.8E-01
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	1.3E+01	1.4E+01	--	--	2.9E-02	3.0E-02	--	--	1.3E+00	1.4E+00	--	--	1.3E+00	1.4E+00

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	2.5E+04	9.8E+04	--	--	5.3E+01	2.1E+02	--	--	2.5E+03	9.8E+03	--	--	2.5E+03	9.8E+03
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	6.0E+03	6.5E+03	--	--	1.3E+01	1.4E+01	--	--	6.0E+02	6.5E+02	--	--	6.0E+02	6.5E+02
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	5.1E+04	2.5E+05	--	--	1.1E+02	5.3E+02	--	--	5.1E+03	2.5E+04	--	--	5.1E+03	2.5E+04
Foaming Agents	0	--	--	5.0E+02	--	--	--	2.3E+04	--	--	--	5.0E+01	--	--	--	2.3E+03	--	--	--	2.3E+03	--
Guthion	0	--	1.0E-02	--	--	--	4.2E-01	--	--	--	2.5E-03	--	--	--	1.0E-01	--	--	--	1.0E-01	--	--
Heptachlor ^c	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	2.2E+01	1.6E-01	4.5E-02	4.5E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	5.4E+00	4.0E-02	4.5E-03	4.5E-03	5.4E+00	4.0E-02	4.5E-03	4.5E-03
Heptachlor Epoxide ^d	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	2.2E+01	1.6E-01	2.2E-02	2.2E-02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	5.4E+00	4.0E-02	2.2E-03	2.2E-03	5.4E+00	4.0E-02	2.2E-03	2.2E-03
Hexachlorobenzene ^e	0	--	--	2.8E-03	2.9E-03	--	--	1.6E-01	1.7E-01	--	--	2.8E-04	2.9E-04	--	--	1.6E-02	1.7E-02	--	--	1.6E-02	1.7E-02
Hexachlorobutadiene ^e	0	--	--	4.4E+00	1.8E+02	--	--	2.5E+02	1.0E+04	--	--	4.4E-01	1.8E+01	--	--	2.5E+01	1.0E+03	--	--	2.5E+01	1.0E+03
Hexachlorocyclohexane Alpha-BHC ^c	0	--	--	2.6E-02	4.9E-02	--	--	1.5E+00	2.8E+00	--	--	2.6E-03	4.9E-03	--	--	1.5E-01	2.8E-01	--	--	1.5E-01	2.8E-01
Hexachlorocyclohexane Beta-BHC ^c	0	--	--	9.1E-02	1.7E-01	--	--	5.2E+00	9.7E+00	--	--	9.1E-03	1.7E-02	--	--	5.2E-01	9.7E-01	--	--	5.2E-01	9.7E-01
Hexachlorocyclohexane Gamma-BHC ^c (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	4.0E+01	--	5.6E+01	1.0E+02	2.4E-01	--	9.8E-02	1.8E-01	1.0E+01	--	5.6E+00	1.0E+01	1.0E+01	--	5.6E+00	1.0E+01
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	1.9E+03	5.1E+04	--	--	4.0E+00	1.1E+02	--	--	1.9E+02	5.1E+03	--	--	1.9E+02	5.1E+03
Hexachloroethane ^d	0	--	--	1.4E+01	3.3E+01	--	--	8.0E+02	1.9E+03	--	--	1.4E+00	3.3E+00	--	--	8.0E+01	1.9E+02	--	--	8.0E+01	1.9E+02
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	8.4E+01	--	--	--	5.0E-01	--	--	--	2.1E+01	--	--	--	2.1E+01	--	--
Indeno (1,2,3-cd) pyrene ^c	0	--	--	3.8E-02	1.8E-01	--	--	2.2E+00	1.0E+01	--	--	3.8E-03	1.8E-02	--	--	2.2E-01	1.0E+00	--	--	2.2E-01	1.0E+00
Iron	0	--	--	3.0E+02	--	--	--	1.4E+04	--	--	--	3.0E+01	--	--	--	1.4E+03	--	--	--	1.4E+03	--
Isophorone ^c	0	--	--	3.5E+02	9.6E+03	--	--	2.0E+04	5.5E+05	--	--	3.5E+01	9.6E+02	--	--	2.0E+03	5.5E+04	--	--	2.0E+03	5.5E+04
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Lead	0	1.9E+02	2.1E+01	1.5E+01	--	7.9E+03	9.0E+02	7.0E+02	--	4.7E+01	5.4E+00	1.5E+00	--	2.0E+03	2.3E+02	7.0E+01	--	2.0E+03	2.3E+02	7.0E+01	--
Malathion	0	--	1.0E-01	--	--	--	4.2E+00	--	--	--	2.5E-02	--	--	--	1.0E+00	--	--	--	1.0E+00	--	--
Manganese	0	--	--	5.0E+01	--	--	--	2.3E+03	--	--	--	5.0E+00	--	--	--	2.3E+02	--	--	--	2.3E+02	--
Mercury	0	1.4E+00	7.7E-01	--	--	5.9E+01	3.2E+01	--	--	3.5E-01	1.9E-01	--	--	1.5E+01	8.1E+00	--	--	1.5E+01	8.1E+00	--	--
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	2.2E+03	7.0E+04	--	--	4.7E+00	1.5E+02	--	--	2.2E+02	7.0E+03	--	--	2.2E+02	7.0E+03
Methylene Chloride ^c	0	--	--	4.6E+01	5.9E+03	--	--	2.6E+03	3.4E+05	--	--	4.6E+00	5.9E+02	--	--	2.6E+02	3.4E+04	--	--	2.6E+02	3.4E+04
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	1.3E+00	4.6E+03	--	--	7.5E-03	1.0E+01	--	--	3.1E-01	4.6E+02	--	--	3.1E-01	4.6E+02	--
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Nickel	0	2.5E+02	2.8E+01	6.1E+02	4.6E+03	1.0E+04	1.2E+03	2.8E+04	2.1E+05	6.2E+01	6.9E+00	6.1E+01	4.6E+02	2.6E+03	2.9E+02	2.8E+03	2.1E+04	2.6E+03	2.9E+02	2.8E+03	2.1E+04
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	4.6E+05	--	--	--	1.0E+03	--	--	--	4.6E+04	--	--	--	4.6E+04	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	7.9E+02	3.2E+04	--	--	1.7E+00	6.9E+01	--	--	7.9E+01	3.2E+03	--	--	7.9E+01	3.2E+03
N-Nitrosodimethylamine ^e	0	--	--	6.9E-03	3.0E+01	--	--	3.9E-01	1.7E+03	--	--	6.9E-04	3.0E+00	--	--	3.9E-02	1.7E+02	--	--	3.9E-02	1.7E+02
N-Nitrosodiphenylamine ^e	0	--	--	3.3E+01	6.0E+01	--	--	1.9E+03	3.4E+03	--	--	3.3E+00	6.0E+00	--	--	1.9E+02	3.4E+02	--	--	1.9E+02	3.4E+02
N-Nitrosodi-n-propylamine ^e	0	--	--	5.0E-02	5.1E+00	--	--	2.9E+00	2.9E+02	--	--	5.0E-03	5.1E-01	--	--	2.9E-01	2.9E+01	--	--	2.9E-01	2.9E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.2E+03	2.8E+02	--	--	7.0E+00	1.7E+00	--	--	2.9E+02	6.9E+01	--	--	2.9E+02	6.9E+01	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	2.7E+00	5.4E-01	--	--	1.6E-02	3.3E-03	--	--	6.8E-01	1.4E-01	--	--	6.8E-01	1.4E-01	--	--
PCB Total ^f	0	--	1.4E-02	6.4E-04	6.4E-04	--	5.9E-01	3.7E-02	3.7E-02	--	3.5E-03	6.4E-05	6.4E-05	--	1.5E-01	3.7E-03	3.7E-03	--	1.5E-01	3.7E-03	3.7E-03
Pentachlorophenol ^c	0	8.0E+00	6.1E+00	2.7E+00	3.0E+01	3.4E+02	2.6E+02	1.5E+02	1.7E+03	2.0E+00	1.5E+00	2.7E-01	3.0E+00	8.4E+01	6.4E+01	1.5E+01	1.7E+02	8.4E+01	6.4E+01	1.5E+01	1.7E+02
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	4.6E+05	4.0E+07	--	--	1.0E+03	8.6E+04	--	--	4.6E+04	4.0E+06	--	--	4.6E+04	4.0E+06
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	3.9E+04	1.9E+05	--	--	8.3E+01	4.0E+02	--	--	3.9E+03	1.9E+04	--	--	3.9E+03	1.9E+04
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	7.0E+02	--	--	--	1.5E+00	--	--	--	7.0E+01	--	--	--	7.0E+01	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.9E+02	1.9E+02	--	--	4.0E-01	4.0E-01	--	--	1.9E+01	1.9E+01	--	--	1.9E+01	1.9E+01
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	2.3E+02	--	--	--	5.0E-01	--	--	--	2.3E+01	--	--	--	2.3E+01	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	1.4E+03	--	--	--	3.0E+00	--	--	--	1.4E+02	--	--	--	1.4E+02	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	8.4E+02	2.1E+02	7.9E+03	2.0E+05	5.0E+00	1.3E+00	1.7E+01	4.2E+02	2.1E+02	5.2E+01	7.9E+02	2.0E+04	2.1E+02	5.2E+01	7.9E+02	2.0E+04
Silver	0	6.5E+00	--	--	--	2.7E+02	--	--	--	1.6E+00	--	--	--	6.8E+01	--	--	--	6.8E+01	--	--	--
Sulfate	0	--	--	2.5E+05	--	--	--	1.2E+07	--	--	--	2.5E+04	--	--	--	1.2E+06	--	--	--	1.2E+06	--
1,1,2,2-Tetrachloroethane ^f	0	--	--	1.7E+00	4.0E+01	--	--	9.7E+01	2.3E+03	--	--	1.7E-01	4.0E+00	--	--	9.7E+00	2.3E+02	--	--	9.7E+00	2.3E+02
Tetrachloroethylene ^f	0	--	--	6.9E+00	3.3E+01	--	--	3.9E+02	1.9E+03	--	--	6.9E-01	3.3E+00	--	--	3.9E+01	1.9E+02	--	--	3.9E+01	1.9E+02
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	1.1E+01	2.2E+01	--	--	2.4E-02	4.7E-02	--	--	1.1E+00	2.2E+00	--	--	1.1E+00	2.2E+00
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	2.4E+04	2.8E+05	--	--	5.1E+01	6.0E+02	--	--	2.4E+03	2.8E+04	--	--	2.4E+03	2.8E+04
Total dissolved solids	0	--	--	5.0E+05	--	--	--	2.3E+07	--	--	--	5.0E+04	--	--	--	2.3E+06	--	--	--	2.3E+06	--
Toxaphene ^c	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	3.1E+01	8.4E-03	1.6E-01	1.6E-01	1.8E-01	5.0E-05	2.8E-04	2.8E-04	7.6E+00	2.1E-03	1.6E-02	1.6E-02	7.6E+00	2.1E-03	1.6E-02	1.6E-02
Tributyltin	0	4.6E-01	7.2E-02	--	--	1.9E+01	3.0E+00	--	--	1.2E-01	1.8E-02	--	--	4.8E+00	7.5E-01	--	--	4.8E+00	7.5E-01	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	1.6E+03	3.3E+03	--	--	3.5E+00	7.0E+00	--	--	1.6E+02	3.3E+02	--	--	1.6E+02	3.3E+02
1,1,2-Trichloroethane ^f	0	--	--	5.9E+00	1.6E+02	--	--	3.4E+02	9.1E+03	--	--	5.9E-01	1.6E+01	--	--	3.4E+01	9.1E+02	--	--	3.4E+01	9.1E+02
Trichloroethylene ^c	0	--	--	2.5E+01	3.0E+02	--	--	1.4E+03	1.7E+04	--	--	2.5E+00	3.0E+01	--	--	1.4E+02	1.7E+03	--	--	1.4E+02	1.7E+03
2,4,6-Trichlorophenol ^c	0	--	--	1.4E+01	2.4E+01	--	--	8.0E+02	1.4E+03	--	--	1.4E+00	2.4E+00	--	--	8.0E+01	1.4E+02	--	--	8.0E+01	1.4E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	2.3E+03	--	--	--	5.0E+00	--	--	--	2.3E+02	--	--	--	2.3E+02	--
Vinyl Chloride ^f	0	--	--	2.5E-01	2.4E+01	--	--	1.4E+01	1.4E+03	--	--	2.5E-02	2.4E+00	--	--	1.4E+00	1.4E+02	--	--	1.4E+00	1.4E+02
Zinc	0	1.6E+02	1.6E+02	7.4E+03	2.6E+04	6.7E+03	6.7E+03	3.4E+05	1.2E+06	4.0E+01	4.0E+01	7.4E+02	2.6E+03	1.7E+03	1.7E+03	3.4E+04	1.2E+05	1.7E+03	1.7E+03	3.4E+04	1.2E+05

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = $(0.25(WQC - \text{background conc.}) + \text{background conc.})$ for acute and chronic
= $(0.1(WQC - \text{background conc.}) + \text{background conc.})$ for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	2.6E+01
Arsenic	4.6E+01
Barium	9.3E+03
Cadmium	9.5E+00
Chromium III	6.3E+02
Chromium VI	6.7E+01
Copper	7.7E+01
Iron	1.4E+03
Lead	7.0E+01
Manganese	2.3E+02
Mercury	4.8E+00
Nickel	1.7E+02
Selenium	3.1E+01
Silver	2.7E+01
Zinc	6.7E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.007 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD) 0.007					<u>Ammonia - Dry Season - Acute</u>		<u>Ammonia - Dry Season - Chronic</u>	
Stream Flows		Total Mix Flows			90th Percentile pH (SU)	8.068	90th Percentile Temp. (deg C)	19.430
<u>Allocated to Mix (MGD)</u>		<u>Stream + Discharge (MGD)</u>			(7.204 - pH)	-0.864	90th Percentile pH (SU)	8.072
	<u>Dry Season</u>	<u>Wet Season</u>	<u>Dry Season</u>	<u>Wet Season</u>	(pH - 7.204)	0.864	MIN	2.077
1Q10	0.270	0.320	0.277	0.327	Trout Present Criterion (mg N/l	4.932	MAX	19.430
7Q10	0.270	N/A	0.277	N/A	Trout Absent Criterion (mg N/L	7.384	(7.688 - pH)	-0.384
30Q10	0.280	0.340	0.287	0.347	Trout Present?	n	(pH - 7.688)	0.384
30Q5	0.300	N/A	0.307	N/A	Effective Criterion (mg N/L)	7.384	Early LS Present Criterion (mg N	1.594
Harm. Mean	0.370	N/A	0.377	N/A			Early LS Absent Criterion (mg N/	1.594
Annual Avg.	0.000	N/A	0.007	N/A			Early Life Stages Present?	y
<u>Stream/Discharge Mix Values</u>							Effective Criterion (mg N/L)	1.594
			<u>Dry Season</u>	<u>Wet Season</u>	<u>Ammonia - Wet Season - Acute</u>		<u>Ammonia - Wet Season - Chronic</u>	
1Q10 90th% Temp. Mix (deg C)			19.423	11.906	90th Percentile pH (SU)	8.086	90th Percentile Temp. (deg C)	11.906
30Q10 90th% Temp. Mix (deg C)			19.430	11.906	(7.204 - pH)	-0.882	90th Percentile pH (SU)	8.092
1Q10 90th% pH Mix (SU)			8.068	8.086	(pH - 7.204)	0.882	MIN	2.850
30Q10 90th% pH Mix (SU)			8.072	8.092	Trout Present Criterion (mg N/l	4.767	MAX	11.906
1Q10 10th% pH Mix (SU)			6.916	N/A	Trout Absent Criterion (mg N/L	7.137	(7.688 - pH)	-0.404
7Q10 10th% pH Mix (SU)			6.916	N/A	Trout Present?	n	(pH - 7.688)	0.404
			<u>Calculated</u>	<u>Formula Inputs</u>	Effective Criterion (mg N/L)	7.137	Early LS Present Criterion (mg N	2.123
1Q10 Hardness (mg/L as CaCO3)			144.0	144.0			Early LS Absent Criterion (mg N/	2.513
7Q10 Hardness (mg/L as CaCO3)			144.0	144.0			Early Life Stages Present?	y
							Effective Criterion (mg N/L)	2.123

0.007 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD) 0.007					<u>Ammonia - Dry Season - Acute</u>		<u>Ammonia - Dry Season - Chronic</u>	
100% Stream Flows		Total Mix Flows			90th Percentile pH (SU)	8.068	90th Percentile Temp. (deg C)	19.430
<u>Allocated to Mix (MGD)</u>		<u>Stream + Discharge (MGD)</u>			(7.204 - pH)	-0.864	90th Percentile pH (SU)	8.072
	<u>Dry Season</u>	<u>Wet Season</u>	<u>Dry Season</u>	<u>Wet Season</u>	(pH - 7.204)	0.864	MIN	2.077
1Q10	0.270	0.320	0.277	0.327	Trout Present Criterion (mg N/l	4.932	MAX	19.430
7Q10	0.270	N/A	0.277	N/A	Trout Absent Criterion (mg N/L	7.384	(7.688 - pH)	-0.384
30Q10	0.280	0.340	0.287	0.347	Trout Present?	n	(pH - 7.688)	0.384
30Q5	0.300	N/A	0.307	N/A	Effective Criterion (mg N/L)	7.384	Early LS Present Criterion (mg N	1.594
Harm. Mean	0.370	N/A	0.377	N/A			Early LS Absent Criterion (mg N/	1.594
Annual Avg.	0.000	N/A	0.007	N/A			Early Life Stages Present?	y
<u>Stream/Discharge Mix Values</u>							Effective Criterion (mg N/L)	1.594
			<u>Dry Season</u>	<u>Wet Season</u>	<u>Ammonia - Wet Season - Acute</u>		<u>Ammonia - Wet Season - Chronic</u>	
1Q10 90th% Temp. Mix (deg C)			19.423	11.906	90th Percentile pH (SU)	8.086	90th Percentile Temp. (deg C)	11.906
30Q10 90th% Temp. Mix (deg C)			19.430	11.906	(7.204 - pH)	-0.882	90th Percentile pH (SU)	8.092
1Q10 90th% pH Mix (SU)			8.068	8.086	(pH - 7.204)	0.882	MIN	2.850
30Q10 90th% pH Mix (SU)			8.072	8.092	Trout Present Criterion (mg N/l	4.767	MAX	11.906
1Q10 10th% pH Mix (SU)			6.916	N/A	Trout Absent Criterion (mg N/L	7.137	(7.688 - pH)	-0.404
7Q10 10th% pH Mix (SU)			6.916	N/A	Trout Present?	n	(pH - 7.688)	0.404
			Calculated	Formula Inputs	Effective Criterion (mg N/L)	7.137	Early LS Present Criterion (mg N	2.123
1Q10 Hardness (mg/L as CaCO3) =			144.000	144.000			Early LS Absent Criterion (mg N/	2.513
7Q10 Hardness (mg/L as CaCO3) =			144.000	144.000			Early Life Stages Present?	y
							Effective Criterion (mg N/L)	2.123

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Facility = Woodhaven Nursing Home STP (0.0066 MGD)

Chemical = ammonia as N (mg/L)

Chronic averaging period = 30

WLAa = 76

WLAc = 16

Q.L. = 0.2

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1/16/2013 5:46:56 PM

Facility = Woodhaven Nursing Home STP (0.0066 MGD)

Chemical = TRC (ug/L)

Chronic averaging period = 4

WLAa = 200

WLAc = 120

Q.L. = 100

samples/mo. = 30

samples/wk. = 8

Summary of Statistics:

observations = 1

Expected Value = 1000

Variance = 360000

C.V. = 0.6

97th percentile daily values = 2433.41

97th percentile 4 day average = 1663.79

97th percentile 30 day average = 1206.05

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 175.508974086388

Average Weekly limit = 104.691995664012

Average Monthly Limit = 86.9859620059178

The data are:

1000

0.025 MGD Facility

Mixing Zone Predictions for

Woodhaven Nursing Home STP

Effluent Flow = 0.025 MGD
Stream 7Q10 = 0.27 MGD
Stream 30Q10 = 0.28 MGD
Stream 1Q10 = 0.27 MGD
Stream slope = 0.025 ft/ft
Stream width = 2.736 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .1881 ft
Length = 36.29 ft
Velocity = .8872 ft/sec
Residence Time = .0005 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .1921 ft
Length = 35.6 ft
Velocity = .8982 ft/sec
Residence Time = .0005 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .1881 ft
Length = 36.29 ft
Velocity = .8872 ft/sec
Residence Time = .0114 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: **Woodhaven Nursing Home STP**

Permit No.: **VA0074870**

Receiving Stream: **Goose Creek, South Fork, UT**

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO ₃) =	144 mg/L
90% Temperature (Annual) =	19.6 deg C
90% Temperature (Wet season) =	11.9 deg C
90% Maximum pH =	8.2 SU
10% Maximum pH =	7 SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	y
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0.27 MGD
7Q10 (Annual) =	0.27 MGD
30Q10 (Annual) =	0.28 MGD
1Q10 (Wet season) =	0.32 MGD
30Q10 (Wet season) =	0.34 MGD
30Q5 =	0.3 MGD
Harmonic Mean =	0.37 MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO ₃) =	144 mg/L
90% Temp (Annual) =	12.2 deg C
90% Temp (Wet season) =	12.2 deg C
90% Maximum pH =	7 SU
10% Maximum pH =	6 SU
Discharge Flow =	0.025 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	6.7E+02	9.9E+02	--	--	8.7E+03	1.3E+04	--	--	6.7E+01	9.9E+01	--	--	8.7E+02	1.3E+03	--	--	8.7E+02	1.3E+03
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	7.9E+01	1.2E+02	--	--	6.1E-01	9.3E-01	--	--	7.9E+00	1.2E+01	--	--	7.9E+00	1.2E+01
Acrylonitrile ^c	0	--	--	5.1E-01	2.5E+00	--	--	8.1E+00	4.0E+01	--	--	5.1E-02	2.5E-01	--	--	8.1E-01	4.0E+00	--	--	8.1E-01	4.0E+00
Aldrin ^c	0	3.0E+00	--	4.9E-04	5.0E-04	3.5E+01	--	7.7E-03	7.9E-03	7.5E-01	--	4.9E-05	5.0E-05	8.9E+00	--	7.7E-04	7.9E-04	8.9E+00	--	7.7E-04	7.9E-04
Ammonia-N (mg/l) (Yearly)	0.110881	1.12E+01	2.23E+00	--	--	1.3E+02	2.6E+01	--	--	2.88E+00	6.40E-01	--	--	3.3E+01	6.6E+00	--	--	3.3E+01	6.6E+00	--	--
Ammonia-N (mg/l) (High Flow)	0.110881	1.05E+01	2.82E+00	--	--	1.4E+02	4.0E+01	--	--	2.70E+00	7.87E-01	--	--	3.6E+01	1.0E+01	--	--	3.6E+01	1.0E+01	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	1.1E+05	5.2E+05	--	--	8.3E+02	4.0E+03	--	--	1.1E+04	5.2E+04	--	--	1.1E+04	5.2E+04
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	7.3E+01	8.3E+03	--	--	5.6E-01	6.4E+01	--	--	7.3E+00	8.3E+02	--	--	7.3E+00	8.3E+02
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	4.0E+03	1.8E+03	1.3E+02	--	8.5E+01	3.8E+01	1.0E+00	--	1.0E+03	4.4E+02	1.3E+01	--	1.0E+03	4.4E+02	1.3E+01	--
Barium	0	--	--	2.0E+03	--	--	--	2.6E+04	--	--	--	2.0E+02	--	--	--	2.6E+03	--	--	--	2.6E+03	--
Benzene ^c	0	--	--	2.2E+01	5.1E+02	--	--	3.5E+02	8.1E+03	--	--	2.2E+00	5.1E+01	--	--	3.5E+01	8.1E+02	--	--	3.5E+01	8.1E+02
Benzidine ^c	0	--	--	8.6E-04	2.0E-03	--	--	1.4E-02	3.2E-02	--	--	8.6E-05	2.0E-04	--	--	1.4E-03	3.2E-03	--	--	1.4E-03	3.2E-03
Benzo (a) anthracene ^c	0	--	--	3.8E-02	1.8E-01	--	--	6.0E-01	2.8E+00	--	--	3.8E-03	1.8E-02	--	--	6.0E-02	2.8E-01	--	--	6.0E-02	2.8E-01
Benzo (b) fluoranthene ^c	0	--	--	3.8E-02	1.8E-01	--	--	6.0E-01	2.8E+00	--	--	3.8E-03	1.8E-02	--	--	6.0E-02	2.8E-01	--	--	6.0E-02	2.8E-01
Benzo (k) fluoranthene ^c	0	--	--	3.8E-02	1.8E-01	--	--	6.0E-01	2.8E+00	--	--	3.8E-03	1.8E-02	--	--	6.0E-02	2.8E-01	--	--	6.0E-02	2.8E-01
Benzo (a) pyrene ^c	0	--	--	3.8E-02	1.8E-01	--	--	6.0E-01	2.8E+00	--	--	3.8E-03	1.8E-02	--	--	6.0E-02	2.8E-01	--	--	6.0E-02	2.8E-01
Bis(2-Chloroethyl) Ether ^c	0	--	--	3.0E-01	5.3E+00	--	--	4.7E+00	8.4E+01	--	--	3.0E-02	5.3E-01	--	--	4.7E-01	8.4E+00	--	--	4.7E-01	8.4E+00
Bis(2-Chloroisopropyl) Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.8E+04	8.5E+05	--	--	1.4E+02	6.5E+03	--	--	1.8E+03	8.5E+04	--	--	1.8E+03	8.5E+04
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	1.2E+01	2.2E+01	--	--	1.9E+02	3.5E+02	--	--	1.2E+00	2.2E+00	--	--	1.9E+01	3.5E+01	--	--	1.9E+01	3.5E+01
Bromoform ^c	0	--	--	4.3E+01	1.4E+03	--	--	6.8E+02	2.2E+04	--	--	4.3E+00	1.4E+02	--	--	6.8E+01	2.2E+03	--	--	6.8E+01	2.2E+03
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	2.0E+04	2.5E+04	--	--	1.5E+02	1.9E+02	--	--	2.0E+03	2.5E+03	--	--	2.0E+03	2.5E+03
Cadmium	0	5.9E+00	1.5E+00	5.0E+00	--	7.0E+01	1.8E+01	6.5E+01	--	1.5E+00	3.8E-01	5.0E-01	--	1.7E+01	4.5E+00	6.5E+00	--	1.7E+01	4.5E+00	6.5E+00	--
Carbon Tetrachloride ^c	0	--	--	2.3E+00	1.6E+01	--	--	3.6E+01	2.5E+02	--	--	2.3E-01	1.6E+00	--	--	3.6E+00	2.5E+01	--	--	3.6E+00	2.5E+01
Chlordane ^c	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.8E+01	5.1E-02	1.3E-01	1.3E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	7.1E+00	1.3E-02	1.3E-02	1.3E-02	7.1E+00	1.3E-02	1.3E-02	1.3E-02
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	1.0E+07	2.7E+06	3.3E+06	--	2.2E+05	5.8E+04	2.5E+04	--	2.5E+06	6.8E+05	3.3E+05	--	2.5E+06	6.8E+05	3.3E+05	--
TRC	0	1.9E+01	1.1E+01	--	--	2.2E+02	1.3E+02	--	--	4.8E+00	2.8E+00	--	--	5.6E+01	3.2E+01	--	--	5.6E+01	3.2E+01	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.7E+03	2.1E+04	--	--	1.3E+01	1.6E+02	--	--	1.7E+02	2.1E+03	--	--	1.7E+02	2.1E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ⁶	0	--	--	4.0E+00	1.3E+02	--	--	6.3E+01	2.1E+03	--	--	4.0E-01	1.3E+01	--	--	6.3E+00	2.1E+02	--	--	6.3E+00	2.1E+02
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	4.4E+03	1.4E+05	--	--	3.4E+01	1.1E+03	--	--	4.4E+02	1.4E+04	--	--	4.4E+02	1.4E+04
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.3E+04	2.1E+04	--	--	1.0E+02	1.6E+02	--	--	1.3E+03	2.1E+03	--	--	1.3E+03	2.1E+03
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	1.1E+03	2.0E+03	--	--	8.1E+00	1.5E+01	--	--	1.1E+02	2.0E+02	--	--	1.1E+02	2.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	9.8E-01	4.8E-01	--	--	2.1E-02	1.0E-02	--	--	2.4E-01	1.2E-01	--	--	2.4E-01	1.2E-01	--	--
Chromium III	0	7.7E+02	1.0E+02	--	--	9.1E+03	1.2E+03	--	--	1.9E+02	2.5E+01	--	--	2.3E+03	2.9E+02	--	--	2.3E+03	2.9E+02	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.9E+02	1.3E+02	--	--	4.0E+00	2.8E+00	--	--	4.7E+01	3.2E+01	--	--	4.7E+01	3.2E+01	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.3E+03	--	--	--	1.0E+01	--	--	--	1.3E+02	--	--	--	1.3E+02	--
Chrysene ^C	0	--	--	3.8E-03	1.8E-02	--	--	6.0E-02	2.8E-01	--	--	3.8E-04	1.8E-03	--	--	6.0E-03	2.8E-02	--	--	6.0E-03	2.8E-02
Copper	0	1.9E+01	1.2E+01	1.3E+03	--	2.2E+02	1.4E+02	1.7E+04	--	4.7E+00	3.1E+00	1.3E+02	--	5.6E+01	3.6E+01	1.7E+03	--	5.6E+01	3.6E+01	1.7E+03	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.6E+02	6.1E+01	1.8E+03	2.1E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	6.5E+01	1.5E+01	1.8E+02	2.1E+04	6.5E+01	1.5E+01	1.8E+02	2.1E+04
DDD ^C	0	--	--	3.1E-03	3.1E-03	--	--	4.9E-02	4.9E-02	--	--	3.1E-04	3.1E-04	--	--	4.9E-03	4.9E-03	--	--	4.9E-03	4.9E-03
DDE ^C	0	--	--	2.2E-03	2.2E-03	--	--	3.5E-02	3.5E-02	--	--	2.2E-04	2.2E-04	--	--	3.5E-03	3.5E-03	--	--	3.5E-03	3.5E-03
DDT ^C	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.3E+01	1.2E-02	3.5E-02	3.5E-02	2.8E-01	2.5E-04	2.2E-04	2.2E-04	3.2E+00	3.0E-03	3.5E-03	3.5E-03	3.2E+00	3.0E-03	3.5E-03	3.5E-03
Demeton	0	--	1.0E-01	--	--	--	1.2E+00	--	--	--	2.5E-02	--	--	--	3.0E-01	--	--	--	3.0E-01	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	2.0E+00	2.0E+00	--	--	4.3E-02	4.3E-02	--	--	5.0E-01	5.0E-01	--	--	5.0E-01	5.0E-01	--	--
Dibenz(a,h)anthracene ^C	0	--	--	3.8E-02	1.8E-01	--	--	6.0E-01	2.8E+00	--	--	3.8E-03	1.8E-02	--	--	6.0E-02	2.8E-01	--	--	6.0E-02	2.8E-01
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	5.5E+03	1.7E+04	--	--	4.2E+01	1.3E+02	--	--	5.5E+02	1.7E+03	--	--	5.5E+02	1.7E+03
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	4.2E+03	1.2E+04	--	--	3.2E+01	9.6E+01	--	--	4.2E+02	1.2E+03	--	--	4.2E+02	1.2E+03
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	8.2E+02	2.5E+03	--	--	6.3E+00	1.9E+01	--	--	8.2E+01	2.5E+02	--	--	8.2E+01	2.5E+02
3,3-Dichlorobenzidine ⁶	0	--	--	2.1E-01	2.8E-01	--	--	3.3E+00	4.4E+00	--	--	2.1E-02	2.8E-02	--	--	3.3E-01	4.4E-01	--	--	3.3E-01	4.4E-01
Dichlorobromomethane ^C	0	--	--	5.5E+00	1.7E+02	--	--	8.7E+01	2.7E+03	--	--	5.5E-01	1.7E+01	--	--	8.7E+00	2.7E+02	--	--	8.7E+00	2.7E+02
1,2-Dichloroethane ^C	0	--	--	3.8E+00	3.7E+02	--	--	6.0E+01	5.8E+03	--	--	3.8E-01	3.7E+01	--	--	6.0E+00	5.8E+02	--	--	6.0E+00	5.8E+02
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	4.3E+03	9.2E+04	--	--	3.3E+01	7.1E+02	--	--	4.3E+02	9.2E+03	--	--	4.3E+02	9.2E+03
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.8E+03	1.3E+05	--	--	1.4E+01	1.0E+03	--	--	1.8E+02	1.3E+04	--	--	1.8E+02	1.3E+04
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	1.0E+03	3.8E+03	--	--	7.7E+00	2.9E+01	--	--	1.0E+02	3.8E+02	--	--	1.0E+02	3.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.3E+03	--	--	--	1.0E+01	--	--	--	1.3E+02	--	--	--	1.3E+02	--
1,2-Dichloropropane ⁶	0	--	--	5.0E+00	1.5E+02	--	--	7.9E+01	2.4E+03	--	--	5.0E-01	1.5E+01	--	--	7.9E+00	2.4E+02	--	--	7.9E+00	2.4E+02
1,3-Dichloropropene ^C	0	--	--	3.4E+00	2.1E+02	--	--	5.4E+01	3.3E+03	--	--	3.4E-01	2.1E+01	--	--	5.4E+00	3.3E+02	--	--	5.4E+00	3.3E+02
Dieldrin ^C	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.8E+00	6.6E-01	8.2E-03	8.5E-03	6.0E-02	1.4E-02	5.2E-05	5.4E-05	7.1E-01	1.7E-01	8.2E-04	8.5E-04	7.1E-01	1.7E-01	8.2E-04	8.5E-04
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	2.2E+05	5.7E+05	--	--	1.7E+03	4.4E+03	--	--	2.2E+04	5.7E+04	--	--	2.2E+04	5.7E+04
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	4.9E+03	1.1E+04	--	--	3.8E+01	8.5E+01	--	--	4.9E+02	1.1E+03	--	--	4.9E+02	1.1E+03
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	3.5E+06	1.4E+07	--	--	2.7E+04	1.1E+05	--	--	3.5E+05	1.4E+06	--	--	3.5E+05	1.4E+06
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.6E+04	5.9E+04	--	--	2.0E+02	4.5E+02	--	--	2.6E+03	5.9E+03	--	--	2.6E+03	5.9E+03
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	9.0E+02	6.9E+04	--	--	6.9E+00	5.3E+02	--	--	9.0E+01	6.9E+03	--	--	9.0E+01	6.9E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.7E+02	3.6E+03	--	--	1.3E+00	2.8E+01	--	--	1.7E+01	3.6E+02	--	--	1.7E+01	3.6E+02
2,4-Dinitrotoluene ^C	0	--	--	1.1E+00	3.4E+01	--	--	1.7E+01	5.4E+02	--	--	1.1E-01	3.4E+00	--	--	1.7E+00	5.4E+01	--	--	1.7E+00	5.4E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	6.5E-07	6.6E-07	--	--	5.0E-09	5.1E-09	--	--	6.5E-08	6.6E-08	--	--	6.5E-08	6.6E-08
1,2-Diphenylhydrazine ⁶	0	--	--	3.6E-01	2.0E+00	--	--	5.7E+00	3.2E+01	--	--	3.6E-02	2.0E-01	--	--	5.7E-01	3.2E+00	--	--	5.7E-01	3.2E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.6E+00	6.6E-01	8.1E+02	1.2E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	6.5E-01	1.7E-01	8.1E+01	1.2E+02	6.5E-01	1.7E-01	8.1E+01	1.2E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.6E+00	6.6E-01	8.1E+02	1.2E+03	5.5E-02	1.4E-02	6.2E+00	8.9E+00	6.5E-01	1.7E-01	8.1E+01	1.2E+02	6.5E-01	1.7E-01	8.1E+01	1.2E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.6E+00	6.6E-01	--	--	5.5E-02	1.4E-02	--	--	6.5E-01	1.7E-01	--	--	6.5E-01	1.7E-01	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	8.1E+02	1.2E+03	--	--	6.2E+00	8.9E+00	--	--	8.1E+01	1.2E+02	--	--	8.1E+01	1.2E+02
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	1.0E+00	4.2E-01	7.7E-01	7.8E-01	2.2E-02	9.0E-03	5.9E-03	6.0E-03	2.5E-01	1.1E-01	7.7E-02	7.8E-02	2.5E-01	1.1E-01	7.7E-02	7.8E-02
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	3.8E+00	3.9E+00	--	--	2.9E-02	3.0E-02	--	--	3.8E-01	3.9E-01	--	--	3.8E-01	3.9E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	6.9E+03	2.7E+04	--	--	5.3E+01	2.1E+02	--	--	6.9E+02	2.7E+03	--	--	6.9E+02	2.7E+03
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.7E+03	1.8E+03	--	--	1.3E+01	1.4E+01	--	--	1.7E+02	1.8E+02	--	--	1.7E+02	1.8E+02
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.4E+04	6.9E+04	--	--	1.1E+02	5.3E+02	--	--	1.4E+03	6.9E+03	--	--	1.4E+03	6.9E+03
Foaming Agents	0	--	--	5.0E+02	--	--	--	6.5E+03	--	--	--	5.0E+01	--	--	--	6.5E+02	--	--	--	6.5E+02	--
Guthion	0	--	1.0E-02	--	--	--	1.2E-01	--	--	--	2.5E-03	--	--	--	3.0E-02	--	--	--	3.0E-02	--	--
Heptachlor ^c	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	6.1E+00	4.5E-02	1.2E-02	1.2E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	1.5E+00	1.1E-02	1.2E-03	1.2E-03	1.5E+00	1.1E-02	1.2E-03	1.2E-03
Heptachlor Epoxide ^d	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	6.1E+00	4.5E-02	6.2E-03	6.2E-03	1.3E-01	9.5E-04	3.9E-05	3.9E-05	1.5E+00	1.1E-02	6.2E-04	6.2E-04	1.5E+00	1.1E-02	6.2E-04	6.2E-04
Hexachlorobenzene ^d	0	--	--	2.8E-03	2.9E-03	--	--	4.4E-02	4.6E-02	--	--	2.8E-04	2.9E-04	--	--	4.4E-03	4.6E-03	--	--	4.4E-03	4.6E-03
Hexachlorobutadiene ^d	0	--	--	4.4E+00	1.8E+02	--	--	7.0E+01	2.8E+03	--	--	4.4E-01	1.8E+01	--	--	7.0E+00	2.8E+02	--	--	7.0E+00	2.8E+02
Hexachlorocyclohexane Alpha-BHC ^c	0	--	--	2.6E-02	4.9E-02	--	--	4.1E-01	7.7E-01	--	--	2.6E-03	4.9E-03	--	--	4.1E-02	7.7E-02	--	--	4.1E-02	7.7E-02
Hexachlorocyclohexane Beta-BHC ^c	0	--	--	9.1E-02	1.7E-01	--	--	1.4E+00	2.7E+00	--	--	9.1E-03	1.7E-02	--	--	1.4E-01	2.7E-01	--	--	1.4E-01	2.7E-01
Hexachlorocyclohexane Gamma-BHC ^c (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	1.1E+01	--	1.5E+01	2.8E+01	2.4E-01	--	9.8E-02	1.8E-01	2.8E+00	--	1.5E+00	2.8E+00	2.8E+00	--	1.5E+00	2.8E+00
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	5.2E+02	1.4E+04	--	--	4.0E+00	1.1E+02	--	--	5.2E+01	1.4E+03	--	--	5.2E+01	1.4E+03
Hexachloroethane ^d	0	--	--	1.4E+01	3.3E+01	--	--	2.2E+02	5.2E+02	--	--	1.4E+00	3.3E+00	--	--	2.2E+01	5.2E+01	--	--	2.2E+01	5.2E+01
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.4E+01	--	--	--	5.0E-01	--	--	--	5.9E+00	--	--	--	5.9E+00	--	--
Indeno (1,2,3-cd) pyrene ^c	0	--	--	3.8E-02	1.8E-01	--	--	6.0E-01	2.8E+00	--	--	3.8E-03	1.8E-02	--	--	6.0E-02	2.8E-01	--	--	6.0E-02	2.8E-01
Iron	0	--	--	3.0E+02	--	--	--	3.9E+03	--	--	--	3.0E+01	--	--	--	3.9E+02	--	--	--	3.9E+02	--
Isophorone ^c	0	--	--	3.5E+02	9.6E+03	--	--	5.5E+03	1.5E+05	--	--	3.5E+01	9.6E+02	--	--	5.5E+02	1.5E+04	--	--	5.5E+02	1.5E+04
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Lead	0	1.9E+02	2.1E+01	1.5E+01	--	2.2E+03	2.5E+02	2.0E+02	--	4.7E+01	5.4E+00	1.5E+00	--	5.6E+02	6.3E+01	2.0E+01	--	5.6E+02	6.3E+01	2.0E+01	--
Malathion	0	--	1.0E-01	--	--	--	1.2E+00	--	--	--	2.5E-02	--	--	--	3.0E-01	--	--	--	3.0E-01	--	--
Manganese	0	--	--	5.0E+01	--	--	--	6.5E+02	--	--	--	5.0E+00	--	--	--	6.5E+01	--	--	--	6.5E+01	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.7E+01	9.1E+00	--	--	3.5E-01	1.9E-01	--	--	4.1E+00	2.3E+00	--	--	4.1E+00	2.3E+00	--	--
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	6.1E+02	2.0E+04	--	--	4.7E+00	1.5E+02	--	--	6.1E+01	2.0E+03	--	--	6.1E+01	2.0E+03
Methylene Chloride ^c	0	--	--	4.6E+01	5.9E+03	--	--	7.3E+02	9.3E+04	--	--	4.6E+00	5.9E+02	--	--	7.3E+01	9.3E+03	--	--	7.3E+01	9.3E+03
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.5E-01	1.3E+03	--	--	7.5E-03	1.0E+01	--	--	8.9E-02	1.3E+02	--	--	8.9E-02	1.3E+02	--
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--
Nickel	0	2.5E+02	2.8E+01	6.1E+02	4.6E+03	2.9E+03	3.3E+02	7.9E+03	6.0E+04	6.2E+01	6.9E+00	6.1E+01	4.6E+02	7.3E+02	8.1E+01	7.9E+02	6.0E+03	7.3E+02	8.1E+01	7.9E+02	6.0E+03
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.3E+05	--	--	--	1.0E+03	--	--	--	1.3E+04	--	--	--	1.3E+04	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	2.2E+02	9.0E+03	--	--	1.7E+00	6.9E+01	--	--	2.2E+01	9.0E+02	--	--	2.2E+01	9.0E+02
N-Nitrosodimethylamine ^d	0	--	--	6.9E-03	3.0E+01	--	--	1.1E-01	4.7E+02	--	--	6.9E-04	3.0E+00	--	--	1.1E-02	4.7E+01	--	--	1.1E-02	4.7E+01
N-Nitrosodiphenylamine ^d	0	--	--	3.3E+01	6.0E+01	--	--	5.2E+02	9.5E+02	--	--	3.3E+00	6.0E+00	--	--	5.2E+01	9.5E+01	--	--	5.2E+01	9.5E+01
N-Nitrosodi-n-propylamine ^d	0	--	--	5.0E-02	5.1E+00	--	--	7.9E-01	8.1E+01	--	--	5.0E-03	5.1E-01	--	--	7.9E-02	8.1E+00	--	--	7.9E-02	8.1E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	3.3E+02	7.8E+01	--	--	7.0E+00	1.7E+00	--	--	8.3E+01	1.9E+01	--	--	8.3E+01	1.9E+01	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	7.7E-01	1.5E-01	--	--	1.6E-02	3.3E-03	--	--	1.9E-01	3.8E-02	--	--	1.9E-01	3.8E-02	--	--
PCB Total ^f	0	--	1.4E-02	6.4E-04	6.4E-04	--	--	1.7E-01	1.0E-02	--	3.5E-03	6.4E-05	6.4E-05	--	4.1E-02	1.0E-03	1.0E-03	--	4.1E-02	1.0E-03	1.0E-03
Pentachlorophenol ^c	0	6.8E+00	5.2E+00	2.7E+00	3.0E+01	8.0E+01	6.2E+01	4.3E+01	4.7E+02	1.7E+00	1.3E+00	2.7E-01	3.0E+00	2.0E+01	1.5E+01	4.3E+00	4.7E+01	2.0E+01	1.5E+01	4.3E+00	4.7E+01
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.3E+05	1.1E+07	--	--	1.0E+03	8.6E+04	--	--	1.3E+04	1.1E+06	--	--	1.3E+04	1.1E+06
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	1.1E+04	5.2E+04	--	--	8.3E+01	4.0E+02	--	--	1.1E+03	5.2E+03	--	--	1.1E+03	5.2E+03
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	2.0E+02	--	--	--	1.5E+00	--	--	--	2.0E+01	--	--	--	2.0E+01	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	5.2E+01	5.2E+01	--	--	4.0E-01	4.0E-01	--	--	5.2E+00	5.2E+00	--	--	5.2E+00	5.2E+00
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	6.5E+01	--	--	--	5.0E-01	--	--	--	6.5E+00	--	--	--	6.5E+00	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.9E+02	--	--	--	3.0E+00	--	--	--	3.9E+01	--	--	--	3.9E+01	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.4E+02	5.9E+01	2.2E+03	5.5E+04	5.0E+00	1.3E+00	1.7E+01	4.2E+02	5.9E+01	1.5E+01	2.2E+02	5.5E+03	5.9E+01	1.5E+01	2.2E+02	5.5E+03
Silver	0	6.5E+00	--	--	--	7.6E+01	--	--	--	1.6E+00	--	--	--	1.9E+01	--	--	--	1.9E+01	--	--	--
Sulfate	0	--	--	2.5E+05	--	--	--	3.3E+06	--	--	--	2.5E+04	--	--	--	3.3E+05	--	--	--	3.3E+05	--
1,1,2,2-Tetrachloroethane ^f	0	--	--	1.7E+00	4.0E+01	--	--	2.7E+01	6.3E+02	--	--	1.7E-01	4.0E+00	--	--	2.7E+00	6.3E+01	--	--	2.7E+00	6.3E+01
Tetrachloroethylene ^f	0	--	--	6.9E+00	3.3E+01	--	--	1.1E+02	5.2E+02	--	--	6.9E-01	3.3E+00	--	--	1.1E+01	5.2E+01	--	--	1.1E+01	5.2E+01
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	3.1E+00	6.1E+00	--	--	2.4E-02	4.7E-02	--	--	3.1E-01	6.1E-01	--	--	3.1E-01	6.1E-01
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	6.6E+03	7.8E+04	--	--	5.1E+01	6.0E+02	--	--	6.6E+02	7.8E+03	--	--	6.6E+02	7.8E+03
Total dissolved solids	0	--	--	5.0E+05	--	--	--	6.5E+06	--	--	--	5.0E+04	--	--	--	6.5E+05	--	--	--	6.5E+05	--
Toxaphene ^c	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	8.6E+00	2.4E-03	4.4E-02	4.4E-02	1.8E-01	5.0E-05	2.8E-04	2.8E-04	2.2E+00	5.9E-04	4.4E-03	4.4E-03	2.2E+00	5.9E-04	4.4E-03	4.4E-03
Tributyltin	0	4.6E-01	7.2E-02	--	--	5.4E+00	8.5E-01	--	--	1.2E-01	1.8E-02	--	--	1.4E+00	2.1E-01	--	--	1.4E+00	2.1E-01	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	4.6E+02	9.1E+02	--	--	3.5E+00	7.0E+00	--	--	4.6E+01	9.1E+01	--	--	4.6E+01	9.1E+01
1,1,2-Trichloroethane ^f	0	--	--	5.9E+00	1.6E+02	--	--	9.3E+01	2.5E+03	--	--	5.9E-01	1.6E+01	--	--	9.3E+00	2.5E+02	--	--	9.3E+00	2.5E+02
Trichloroethylene ^c	0	--	--	2.5E+01	3.0E+02	--	--	4.0E+02	4.7E+03	--	--	2.5E+00	3.0E+01	--	--	4.0E+01	4.7E+02	--	--	4.0E+01	4.7E+02
2,4,6-Trichlorophenol ^c	0	--	--	1.4E+01	2.4E+01	--	--	2.2E+02	3.8E+02	--	--	1.4E+00	2.4E+00	--	--	2.2E+01	3.8E+01	--	--	2.2E+01	3.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	6.5E+02	--	--	--	5.0E+00	--	--	--	6.5E+01	--	--	--	6.5E+01	--
Vinyl Chloride ^f	0	--	--	2.5E-01	2.4E+01	--	--	4.0E+00	3.8E+02	--	--	2.5E-02	2.4E+00	--	--	4.0E-01	3.8E+01	--	--	4.0E-01	3.8E+01
Zinc	0	1.6E+02	1.6E+02	7.4E+03	2.6E+04	1.9E+03	1.9E+03	9.6E+04	3.4E+05	4.0E+01	4.0E+01	7.4E+02	2.6E+03	4.7E+02	4.7E+02	9.6E+03	3.4E+04	4.7E+02	4.7E+02	9.6E+03	3.4E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = $(0.25(WQC - \text{background conc.}) + \text{background conc.})$ for acute and chronic
= $(0.1(WQC - \text{background conc.}) + \text{background conc.})$ for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	7.3E+00
Arsenic	1.3E+01
Barium	2.6E+03
Cadmium	2.7E+00
Chromium III	1.8E+02
Chromium VI	1.9E+01
Copper	2.2E+01
Iron	3.9E+02
Lead	2.0E+01
Manganese	6.5E+01
Mercury	1.4E+00
Nickel	4.9E+01
Selenium	8.9E+00
Silver	7.6E+00
Zinc	1.9E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.025 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD) 0.025					<u>Ammonia - Dry Season - Acute</u>		<u>Ammonia - Dry Season - Chronic</u>	
Stream Flows		Total Mix Flows			90th Percentile pH (SU)	7.846	90th Percentile Temp. (deg C)	18.993
<u>Allocated to Mix (MGD)</u>		<u>Stream + Discharge (MGD)</u>			(7.204 - pH)	-0.642	90th Percentile pH (SU)	7.854
<u>Dry Season</u>	<u>Wet Season</u>	<u>Dry Season</u>	<u>Wet Season</u>		(pH - 7.204)	0.642	MIN	2.136
1Q10	0.270	0.320	0.295	0.345	Trout Present Criterion (mg N/l)	7.463	MAX	18.993
7Q10	0.270	N/A	0.295	N/A	Trout Absent Criterion (mg N/L)	11.175	(7.688 - pH)	-0.166
30Q10	0.280	0.340	0.305	0.365	Trout Present?	n	(pH - 7.688)	0.166
30Q5	0.300	N/A	0.325	N/A	Effective Criterion (mg N/L)	11.175	Early LS Present Criterion (mg N)	2.227
Harm. Mean	0.370	N/A	0.395	N/A			Early LS Absent Criterion (mg N)	2.227
Annual Avg.	0.000	N/A	0.025	N/A			Early Life Stages Present?	y
							Effective Criterion (mg N/L)	2.227
<u>Stream/Discharge Mix Values</u>					<u>Ammonia - Wet Season - Acute</u>		<u>Ammonia - Wet Season - Chronic</u>	
		<u>Dry Season</u>	<u>Wet Season</u>		90th Percentile pH (SU)	7.883	90th Percentile Temp. (deg C)	11.921
1Q10 90th% Temp. Mix (deg C)		18.973	11.922		(7.204 - pH)	-0.679	90th Percentile pH (SU)	7.895
30Q10 90th% Temp. Mix (deg C)		18.993	11.921		(pH - 7.204)	0.679	MIN	2.850
1Q10 90th% pH Mix (SU)		7.846	7.883		Trout Present Criterion (mg N/l)	6.983	MAX	11.921
30Q10 90th% pH Mix (SU)		7.854	7.895		Trout Absent Criterion (mg N/L)	10.456	(7.688 - pH)	-0.207
1Q10 10th% pH Mix (SU)		6.754	N/A		Trout Present?	n	(pH - 7.688)	0.207
7Q10 10th% pH Mix (SU)		6.754	N/A		Effective Criterion (mg N/L)	10.456	Early LS Present Criterion (mg N)	2.815
		<u>Calculated</u>	<u>Formula Inputs</u>				Early LS Absent Criterion (mg N)	3.329
1Q10 Hardness (mg/L as CaCO3)		144.0	144.0				Early Life Stages Present?	y
7Q10 Hardness (mg/L as CaCO3)		144.0	144.0				Effective Criterion (mg N/L)	2.815

0.025 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD) 0.025					<u>Ammonia - Dry Season - Acute</u>		<u>Ammonia - Dry Season - Chronic</u>	
	100% Stream Flows		Total Mix Flows		90th Percentile pH (SU)	7.846	90th Percentile Temp. (deg C)	18.993
	<u>Allocated to Mix (MGD)</u>		<u>Stream + Discharge (MGD)</u>		(7.204 - pH)	-0.642	90th Percentile pH (SU)	7.854
	<u>Dry Season</u>	<u>Wet Season</u>	<u>Dry Season</u>	<u>Wet Season</u>	(pH - 7.204)	0.642	MIN	2.136
1Q10	0.270	0.320	0.295	0.345	Trout Present Criterion (mg N/l	7.463	MAX	18.993
7Q10	0.270	N/A	0.295	N/A	Trout Absent Criterion (mg N/L	11.175	(7.688 - pH)	-0.166
30Q10	0.280	0.340	0.305	0.365	Trout Present?	n	(pH - 7.688)	0.166
30Q5	0.300	N/A	0.325	N/A	Effective Criterion (mg N/L)	11.175	Early LS Present Criterion (mg N	2.227
Harm. Mean	0.370	N/A	0.395	N/A			Early LS Absent Criterion (mg N/	2.227
Annual Avg.	0.000	N/A	0.025	N/A			Early Life Stages Present?	y
	<u>Stream/Discharge Mix Values</u>						Effective Criterion (mg N/L)	2.227
		<u>Dry Season</u>	<u>Wet Season</u>		<u>Ammonia - Wet Season - Acute</u>		<u>Ammonia - Wet Season - Chronic</u>	
1Q10 90th% Temp. Mix (deg C)		18.973	11.922		90th Percentile pH (SU)	7.883	90th Percentile Temp. (deg C)	11.921
30Q10 90th% Temp. Mix (deg C)		18.993	11.921		(7.204 - pH)	-0.679	90th Percentile pH (SU)	7.895
1Q10 90th% pH Mix (SU)		7.846	7.883		(pH - 7.204)	0.679	MIN	2.850
30Q10 90th% pH Mix (SU)		7.854	7.895		Trout Present Criterion (mg N/l	6.983	MAX	11.921
1Q10 10th% pH Mix (SU)		6.754	N/A		Trout Absent Criterion (mg N/L	10.456	(7.688 - pH)	-0.207
7Q10 10th% pH Mix (SU)		6.754	N/A		Trout Present?	n	(pH - 7.688)	0.207
		<u>Calculated</u>	<u>Formula Inputs</u>		Effective Criterion (mg N/L)	10.456	Early LS Present Criterion (mg N	2.815
1Q10 Hardness (mg/L as CaCO3) =		144.000	144.000				Early LS Absent Criterion (mg N/	3.329
7Q10 Hardness (mg/L as CaCO3) =		144.000	144.000				Early Life Stages Present?	y
							Effective Criterion (mg N/L)	2.815

1/22/2013 11:41:00 AM

Facility = Woodhaven Nursing Home STP (0.025 MGD)

Chemical = TRC (ug/L)

Chronic averaging period = 4

WLAa = 56

WLAc = 32

Q.L. = 100

samples/mo. = 30

samples/wk. = 8

Summary of Statistics:

observations = 1

Expected Value = 1000

Variance = 360000

C.V. = 0.6

97th percentile daily values = 2433.41

97th percentile 4 day average = 1663.79

97th percentile 30 day average = 1206.05

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 46.8023930897034

Average Weekly limit = 27.9178655104031

Average Monthly Limit = 23.1962565349114

The data are:

1000

1/22/2013 11:39:25 AM

Facility = Woodhaven Nursing Home STP (0.025 MGD)

Chemical = ammonia (mg/L)

Chronic averaging period = 30

WLAa = 33

WLAc = 6.6

Q.L. = 0.2

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 13.3166226165476

Average Weekly limit = 13.3166226165477

Average Monthly Limit = 13.3166226165477

The data are:

Attachment I

Public Notice

PUBLIC NOTICE – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Bedford County, Virginia

PUBLIC COMMENT PERIOD: February 28, 2013 through March 29, 2103

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS, AND PERMIT NUMBER: Family Health Initiatives Inc., PO Box 168 Montvale, Virginia 24122, VA0074870

FACILITY NAME AND LOCATION: Woodhaven Nursing Home STP, 13055 West Lynchburg-Salem Turnpike, Montvale, Virginia 24122

PROJECT DESCRIPTION: Family Health Initiatives, Inc. has applied for a reissuance of a permit for the wastewater treatment plant in Bedford County. The applicant proposes to release treated sewage wastewater at a rate of 4,800 gallons per day from the current facility into a water body. The owner has also applied to release treated sewage at a rate of 6,600 gallons per day and 25,000 gallons per day from proposed treatment plant upgrades. Septage from the treatment process will be disposed of at a wastewater treatment plant. The facility proposes to release the treated sewage to an unnamed tributary to the South Fork of Goose Creek in Bedford County in the Upper Goose Creek Watershed (VAW-L20R). A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: nutrients, organic matter, solids, toxic pollutants

TOTAL MAXIMUM DAILY LOAD DEVELOPMENT FOR STAUNTON RIVER WATERSHED: This TMDL was approved by the Environmental Protection Agency on June 22, 2006 and can be found on the following website: <http://www.deq.virginia.gov/portals/0/DEQ/Water/TMDL/apptmdls/roankrvr/staunton.pdf> The original TMDL was designed to accommodate increases in permit capacity such as the proposed flow discharge rates of 6,600 gallons per day and 25,000 gallons per day. Updating the *E. coli* allocations in the *Bacteria TMDLs for the Cub Creek, Turnip Creek, Buffalo Creek, Buffalo Creek (UT), and Staunton River Watersheds, Virginia* will be consistent with the facility's *E. coli* limitations.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax, or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for a public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if a public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS, AND ADDITIONAL INFORMATION:

Becky L. France; ADDRESS: Virginia Department of Environmental Quality, Blue Ridge Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019-2738; (540) 562-6700; E-MAIL ADDRESS: becky.france@deq.virginia.gov; FAX: (540) 562-6725. The public may review the draft permit and application at the DEQ office named above (by appointment) or may request copies of the documents from the contact person listed above.

Attachment J
EPA Checksheet

Revised 2/2003

**State "FY2003 Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review**

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Woodhaven Nursing Home STP

NPDES Permit Number: VA0074870

Permit Writer Name: Becky L. France

Date: 12/30/12

Major []

Minor [X]

Industrial []

Municipal [X]

I.A. Draft Permit Package Submittal Includes:

	Yes	No	N/A
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?	X		
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?			X
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics

	Yes	No	N/A
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet or permit contain a description of the wastewater treatment process?	X		

I.B. Permit/Facility Characteristics – cont. (FY2003)	Yes	No	N/A
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants? BOD ₅ & TSS loadings due to change from 1 to 2 significant figures.	X		
7. Does the fact sheet or permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water? UT not listed		X	
a. Has a TMDL been developed and approved by EPA for the impaired water?	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit? Backsliding allowed to proposed facility, limits not in effect. Also, backsliding due to technical error allowed for TSS loading limits. See No. 18 of Fact Sheet for further explanation.	X		
10. Does the permit authorize discharges of storm water?			X
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?			X
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist (FY2003)

Region III NPDES Permit Quality Checklist – for POTWs (To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration

	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements

	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?	X		

II.C. Technology-Based Effluent Limits (POTWs)

	Yes	No	N/A
1. Does the permit contain numeric limits for <u>ALL</u> of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits

	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL? (E. coli)	X		

II.D. Water Quality-Based Effluent Limits – cont. (FY2003)	Yes	No	N/A
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a “reasonable potential” evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the “reasonable potential” evaluation was performed in accordance with the State’s approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have “reasonable potential”?	X		
d. Does the fact sheet indicate that the “reasonable potential” and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which “reasonable potential” was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an “antidegradation” review was performed in accordance with the State’s approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			X
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?		X	

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?			X
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont. (FY2003)	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?			X
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate/ Pretreatment Program requirements?			X

II.G. Standard Conditions	Yes	No	N/A
1. Does the permit contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		
List of Standard Conditions – 40 CFR 122.41			
Duty to comply	Property rights	Reporting Requirements	
Duty to reapply	Duty to provide information	Planned change	
Need to halt or reduce activity	Inspections and entry	Anticipated noncompliance	
not a defense	Monitoring and records	Transfers	
Duty to mitigate	Signatory requirement	Monitoring reports	
Proper O & M	Bypass	Compliance schedules	
Permit actions	Upset	24-Hour reporting	
		Other non-compliance	
2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part II. NPDES Draft Permit Checklist (FY2003)

Region III NPDES Permit Quality Review Checklist – For Non-Municipals

(To be completed and included in the record for all non-POTWs)

-----NOT APPLICABLE-----

Part III. Signature Page (FY2003)

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	<u>Becky L. France</u>
Title	<u>Water Permit Writer</u>
Signature	<u>Becky L. France</u>
Date	<u>12/30/12 (2/5/13)</u>